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CXR telcom

MAINTENANCE PRACTICE

for the

702 TRANSMISSION TEST SET

CXR Telcom Corporation
521 Charcot Avenue, San Jose, CA 95131

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SECTION 1 - INTRODUCTION

1.0 GENERAL DESCRIPTION

1.1. INTRODUCTION.

This manual contains maintenance instructions with parts breakdown for the CXR Model 702 Transmission Test Set.

1.2. DESCRIPTION.

The CXR Telcom Model 702 Transmission Test Set is a three function transmission test set designed for installation in an equipment rack. Typical applications include test boards, equipment rooms, and tech control centers.

The signal generator section is a sine wave oscillator which generates adjustable frequencies ranging from 50 Hz to 20 kHz and levels of -50 up to +10 dBm. Output level is adjustable in 0.1 dB increments.

Three frequency control modes are provided:

SLOPE: Three frequencies are available on a sequential basis, starting with 1004 Hz, then progressing to 2804 and 404 Hz.

STEP: The frequency plan starts at 1004 Hz, then sequentially steps up or down in 100 Hz steps with limits at 104 Hz and 20004 Hz.

TUNE: Any frequency from 50 Hz to 20 kHz may be selected using the up/down keys. A momentary keystroke produces a single step change. Holding the key depressed produces continued step changes until key is released.

QUIET: The oscillator is muted and provides a quiet termination to the line under test.

RECEIVER: Receiver section measures LEVEL and FREQUENCY or NOISE. The latter may be measured with a C/MESSAGE, C-NOTCHED, or 3-kHz FLAT filter. For a noise with tone measurement, the signal to noise ratio (S/N) may be displayed directly.

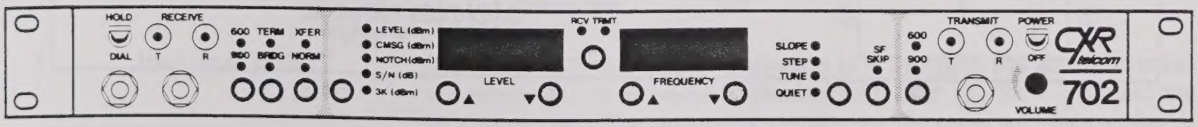


Figure 1-1: CXR Model 702 Transmission Test Set

SECTION 2 - INSTALLATION INSTRUCTIONS

The CXR Telcom Model 702 Transmission Test Set occupies one rack mounting space (1 3/4 inches) in a standard EIA 19 inch equipment rack. Extension brackets may be used to install the unit in a 23 inch rack. The mounting flanges are adjusted for flush mounting at the factory but may be moved back so that the panel protrudes five inches in front of the mounting surface. Rack mounting screws are not furnished with the unit.

2.1 POWER

The standard unit operates from 115 VAC commercial power. This is connected to the test set by means of a standard instrument power cord. Optional ordering codes provide 230 VAC or -48 VDC power operation. The correct fuse size for all power options is as follows:

48 VDC	@ 1.0 Amp
115 VAC	@ 0.5 Amp
230 VAC	@ 0.3 Amp

2.2 WIRING

The line connections may be permanently wired to remotely located jacks or a test system. The terminal designations on the terminal strip are as follows:

TERMINAL	FUNCTION
1	TRMT tip
2	TRMT ring
3	SLEEVE *
4	RCV tip
5	RCV ring
6	SLEEVE *

Note: SLEEVE leads (*) are tied together but not grounded in the set.

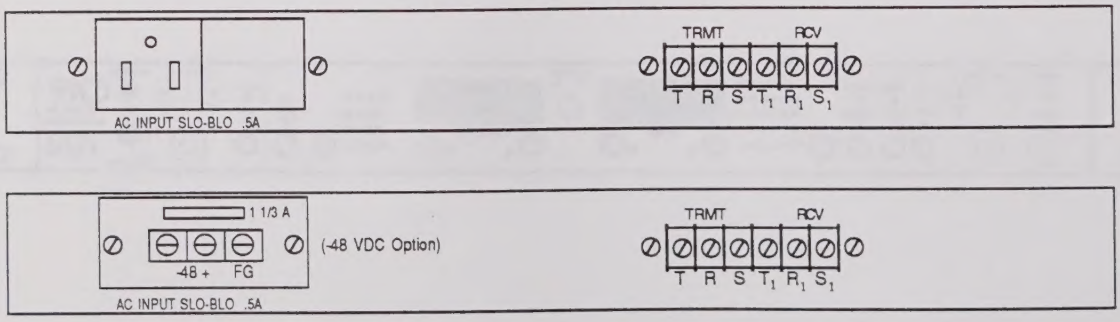


Figure 2-1: Model 702 Rear Panel

SECTION 3 - FUNCTIONAL DESCRIPTION

This section describes the function of the front panel controls, indicators, and jacks. There are no internal switches.

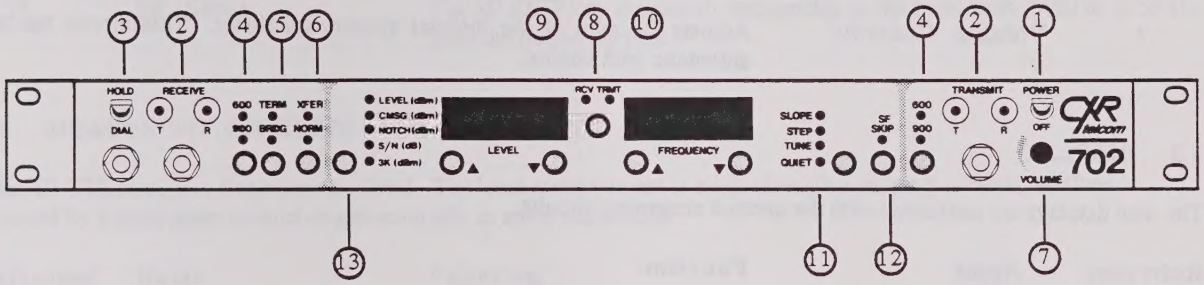


Figure 3 - 1: Controls and Indicators

3.1 POWER

Reference	Name	Function
1	**Power Switch:**	Power is switched ON when the switch is in the UP position and OFF when in the DOWN position.

3.2 LINE INTERFACE

Dual TRANSMIT and RECEIVE connectors and a DIAL interface are provided. Impedance may be set independently and the receiver may be bridged to the line. An internal speaker provides audible monitoring.

Reference	Name	Function
2	**Line Jacks:**	Line receive and transmit sides are connected to the RCV and TRMT jacks respectively. Two-wire lines are connected to the RCV jack only. Jacks are designed for 310 type plugs and are wired TIP/RING. All SLEEVE's are tied together but not grounded in the set. Binding posts are wired in parallel with the jacks as follows: Red post - RING Green post - TIP
3	**Dial and Hold:**	The DIAL jack provides a connection to a two-wire line for an external telephone set. It is wired in parallel with both the RCV jack and the holding circuit. The measuring circuits are disconnected when a plug is inserted in the DIAL jack. The HOLD switch operates an electronic holding circuit which is set to draw 25 mA from the line under test.
4	**Impedance:**	The impedance of the test set may be set to 600 or 900 Ohms to match the line under test. NOTE: The TRMT and RCV interfaces have independent controls.

5	**Termination:**	The BRIDGE position removes the internal RCV line termination to allow monitoring without double terminating a line under test.
6	**Transfer Switch:**	The signal generator and measuring circuits behind the line interface may be interchanged by selecting XFER. This feature is used for testing two-wire, dial-up lines.
7	**Volume Control:**	Adjusts the gain of the internal speaker amplifier. This circuit has no automatic gain control.

3.3 DISPLAY

The dual displays are associated with the internal measuring circuits.

Reference	Name	Function
8	**TRMT/RCV Switch:**	This switch connects the measuring circuits (which drive the display) to either the oscillator or to the line under test. This switch does not change the test condition.
9	**Left Display:**	This display shows the value of the measured parameter in the following units: LEVEL - dBm NOISE - dBm S/N - dB
10	**Right Display:**	The right display shows the frequency of the signal being measured, in units of kHz. Resolution is: 1 Hz - 50 to 9999 Hz 10 Hz - 10 to 20 kHz

3.4 TRANSMITTER CONTROLS

Reference	Name	Function
11	**Generator Control:**	The test oscillator generates a sine wave signal with a frequency variable from 50 Hz to 20 kHz at an amplitude ranging from -50 to +10 dBm. The mode key switch selects the following frequency plans: SLOPE: Three frequencies, 1004, 404, 2804 Hz are available in rotation. STEP: Frequencies from 104 to 20004 Hz, in 100 Hz steps, are available in rotation. The first frequency is always 1004 Hz. TUNE: Any frequency from 50 Hz to 20 kHz is available in 1 Hz steps. QUIET: The oscillator is muted and provides a quiet termination to the line under test.

	Frequency Control:	The up/down keys below the right display are used to advance the transmitter to the next frequency in the plan selected by the mode switch. The up/down keys below the left display are used to control the transmit level. Single key strokes change one step, continuous operation results in a speed change every decade.
12	**SF Skip:**	The SF SKIP key deletes all frequencies in the band from 2450 to 2750 Hz from the frequency plan.

3.5 MEASURING CIRCUITS

The 702 TTS measures frequency and level. The level measurement is made through a shaping network, or filter, selected by a front panel control or automatically in some test modes.

Reference	Name	Function
13	**Function Select:**	The parameter to be measured is selected with this key switch. Signal shaping and units are as follows: LEVEL: Tone level measurement. Units are dBm. C-MSG: Noise measurement with a C-Message filter. Units are dBrn. NOTCH: Noise measurement with a C-Message plus a 1010 Hz notch filter. Units are dBrn. S/N: Tone level and noise power are measured alternately. The signal to noise ratio is then calculated and displayed in dB. 3-kHz: Noise measurement with a low-pass filter. Units are dBrn.

SECTION 4 - SPECIFICATIONS

4.1. PERFORMANCE CHARACTERISTICS.

Performance characteristics of the 702 Transmission Test Set are provided in Table 4-1

TABLE 4-1

TRANSMITTER:

Frequency range	50 to 20,000 Hz
Frequency selection	
SLOPE	1004, 404 and 2804 Hz
STEP	104 to 20,004 Hz in 100 Hz steps
TUNE	50 to 20,000 Hz
QUIET	provides a termination only
Accuracy	1 Hz
Output level	-40 to +10 dBm in 0.1 dB steps
Flatness	±0.1 dB at 1004 Hz, -19 to 0 dBm
	±0.2 dB, 200 Hz to 15 kHz
	±0.5 dB, 50 to 200 Hz and 15 to 20 kHz
Distortion	<-40 dB, 50 to 100 Hz and 3 to 20 kHz

FREQUENCY MEASUREMENT:

Range	50 Hz to 20 kHz
Level range	-50 to +10 dBm
Accuracy	±one count (S/N >20)
Resolution	1 Hz, 50 Hz to 9.999 kHz
	10 Hz, 10 to 20 kHz

LEVEL MEASUREMENT:

Range	<-50 dBm to +10 dBm
Accuracy	0.1 dB at 1004 Hz, -19 to 0 dBm
	0.2 dB, 200 Hz to 15 kHz
	0.5 dB, 50 to 200 Hz
	0.5 dB, 15 to 20 kHz
Resolution	0.1 dB

NOISE MEASUREMENT:

Range, NOISE	10 to 90 dBrn
S/N	10 to 50 dB
Selectable filters	C-Message, C-Notch and 3-kHz FLAT
Notch filter	50 dB, 995 to 1025 Hz
Resolution	1 dB
Accuracy	1 dB, 20 to 90 dBrn
	2 dB, 10 to 20 dBrn

GENERAL:

Impedance	600 and 900 Ohms
Bridging impedance	>50 k Ohms
Holding current	25 mA, nominal
Size	1.75 x 19 x 14 inches
Weight	approx.. 10 lbs.
Power	115 or 220 Vac, 50/60 Hz or -48Vdc 1amp.
Temperature, operating	0 to 50 degrees C.
Temperature, storage	-25 to +75 degrees C.

CXR Telcom reserves the right to change these specifications without notice.

Optional Accessories:

Rack mount brackets 23" (1"CTR).	P/N 2500-1702-30
Rack mount brackets 19"	P/N 2500-1702-26

SECTION 5 - CAUTIONS FOR ELECTROSTATIC BREAKDOWN PREVENTION

Most components vital to the operation of this equipment are highly sensitive to electrostatic discharge (ESD). They may suffer complete or partial breakdown (partial breakdowns are the most difficult to repair) due to the potential difference generated by the charged electrostatic load, etc. on clothing and the human body. This section explains how you can minimize the chances of destroying such devices by:

1. Knowing that there is a problem.
2. Learning the guidelines for handling parts.
3. Following the recommended procedures, packaging and bench methods.

The practices that should be followed to minimize damage to static sensitive (S.S.) devices are:

1. Minimize the handling of the spare parts.
2. Keep parts in original containers until ready for use.
3. Discharge personal static before handling devices.
4. Handle S.S. devices by the body.
5. Use anti-static containers for handling and transport.
6. Do not rub or slide S.S. devices over any surface.
7. Avoid static generating materials such as plastic, vinyl, styrofoam or cigarette wrappers in work area.
8. Handle S.S. devices only at a static-free work station.

When opening or repairing the unit, the following procedure for grounding is required to prevent damage caused by electrostatic discharge.

1. Grounding for the human body. BE SURE to put on a wrist-strap for grounding, the other end of which is earth grounded (with impedance lower than 100 megohm). The strap works to drain away the static electricity build-up on the human body.

2. Be sure to lay a conductive sheet on the table (with impedance lower than 1000 megohm) and ground it. Such conductive mats or sheets are available at some computer or electronic stores.

3. Be careful not to let your clothes touch the unit or a device, as static electricity build-up on clothes is not drained away, .

4. If chair feet or floor are non-conducting, the chair must have a ground strap, too.

5. Use only anti-static type solder-sucker.

6. Only grounded tip soldering irons should be used.

SECTION 6: THEORY OF OPERATION:

6.0 THEORY OF OPERATION

This section contains functional descriptions keyed to simplified block diagrams. The block diagrams are drawn for function and do not show circuit details.

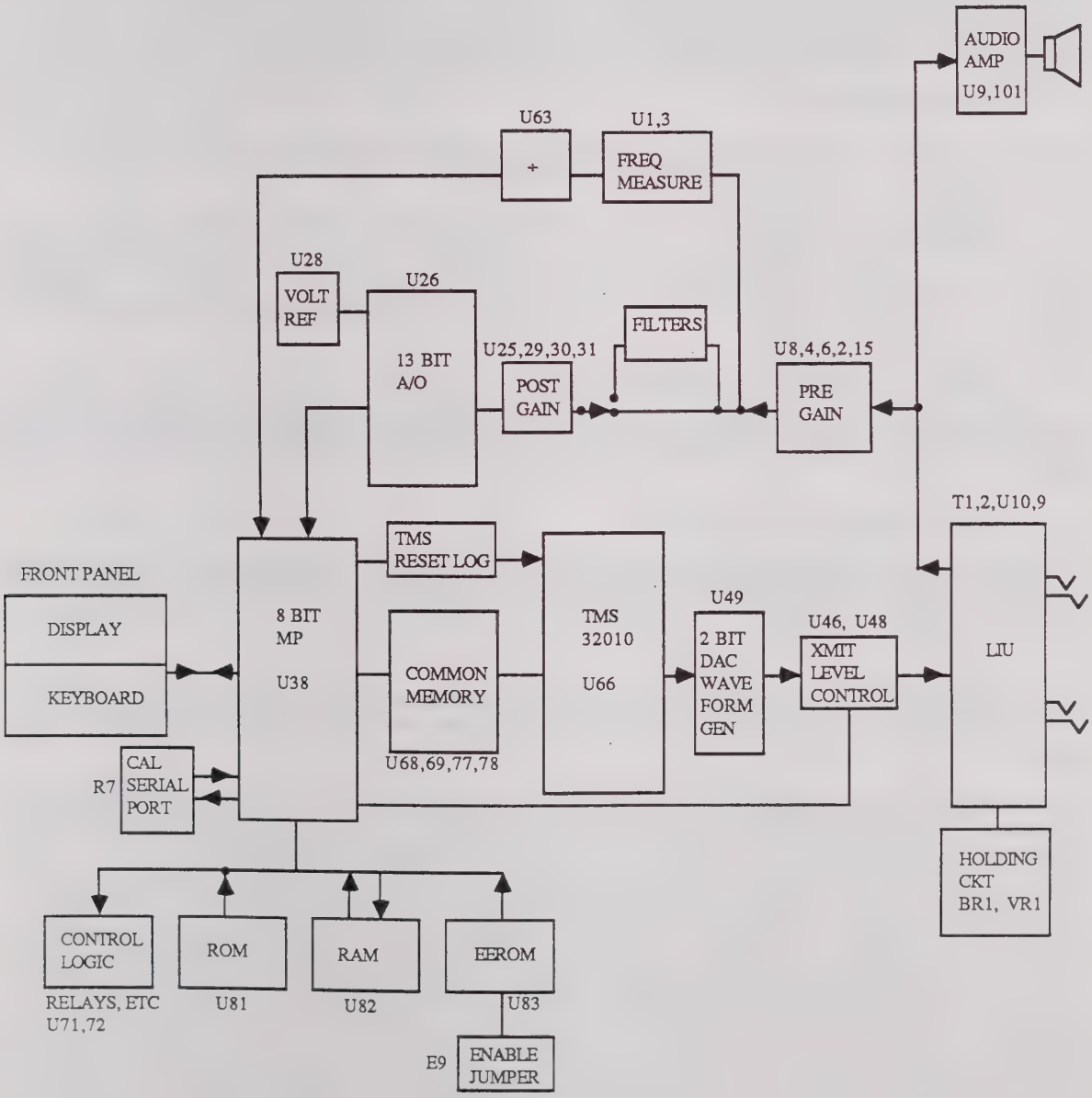


Figure 6-1: Functional block diagram of Model 702.

6.1 MAIN MICROPROCESSOR.

All functions and routine operations such as control of relays and switches, reading of keyboard, control and update of displays, internal operations like gain auto-ranging, indicators, filter controls and calibrations learn-mode are mostly controlled by the (U38) 63B03 8-bit CMOS microprocessor, except for the Sine wave generation task which is entirely done by the (U66) TMS320C10 digital signal processor.

In the case of the Sine wave generator (U66), whenever commands are issued from the keyboard the U38 CPU will run it through the ROM's operation program (U81). The main CPU (U38) will hold the DSP(U66) in reset (RS) state through U84, 58. It loads the sine program table routine to the DSP`s common memory U68 to 78. The program is down loaded (common memory is dedicated to the operation of the U66), the U71 pin 18 START320 will go low and start the U66, picking up the sine table values from its common memory, as well as some programs to execute the sine table. After the follow up goes to the RESET location to reset all registers, then a short program from the memory will run it.

6.3 ROM and RAMs.

Except for the common memory, the main microprocessor has its own small static RAM (U82), and an EPROM (U81) used to store all operation instructions including calibration routine.

6.4 EEPROM (U83).

This specific memory device functions like a RAM and ROM. It has the capability to store and hold data even when the power is shut off. Most data stored on this location are the values for calibration constants. Contents can be altered only while the 702 is in calibration mode.

6.5 ANALOG TO DIGITAL CONVERTER.

A/D converter is another main block in this system. An AD7552 12-bit plus sign monolithic A/D converter(U26) chip is used with its associated circuitry in which are clock, stop signal, a programmable voltage reference integrated circuit (U28).

6.6 LINE INTERFACE UNIT (LIU).

This block of the 702 contains the circuitry necessary to connect the system to the external lines. It basically consists of isolated line transformers and relay switches.

6.7 RECEIVE MODE OPERATION.

310 jacks and pairs of bind posts in the front panel were provided for quick connection to 2-wire or 4-wire telephone lines. A terminal block, accessible at the back of the system, for permanent installation when rack mounted is also provided.

In a NORM and RCV mode operation, K2 relays route the line signals through T1 transformer. Switched holding circuit BR1 and VR1 could hold the telephone lines while measuring and dialing. C1 and C2 decoupling capacitors blocks incoming DC voltages. On the system side of T1 are the relays for bridging and terminating the lines with 600 or 900 ohms. In this mode (RCV), the pin 13 of MUX U10 is selected by the signal LIU 1, 2 and 3. Output is then buffered by U9 unity gain amplifier and distributed as AUDIO, to be amplified by the U101 for audio speaker monitoring. Volume control is provided in the front panel. The other distributed signal LIU OUT is then fed to a 80 dB with 20 dB per step Pre-gain amplifier stage U8, with the combination of U2, 4, 5 and 8. Signal on TP6 is maintained at a clean, readable level unless the signal being measured goes too faint to read (UNDER range) or too strong (OVER range) and PGA can no longer attenuate the signal. Between the U8 and U5 is an amplifier with 20 dB gain feeding a Sine to Square wave converter circuit for use in frequency sampling and display. There is a pass-filter which notch a (HUM) 60 Hz and a buffer U24, either can be selected by the control signal 60Hz. Output is then fed to another programmable gain amplifier U25. Again, U25, 29 and 30 were formed as an automatic gain circuit. Post-gain stage works in conjunction when a filter 50 dB less is selected, output is fed to the U26 Analog to Digital conversion. Output is then sampled by the CPU and interpreted as LEVEL and displayed. Unit of display depends on what function was selected by the program.

6.8 TRANSMITTER OPERATION.

After initiation from power-up, CPU U38 will hold the U66 digital signal processor to reset and down-load all key programs, sine table and constants to the common memory. It will also reset all registers, run the U66 and put out a signal WAVE. The signal is then processed by the low-pass filters U41. At this step, the main CPU is now free to execute other routines since DSP can run by itself with its own small program stored in common memory. The transmitter level and frequency controls can remain active at all times. Transmission level is set to 0 dBm by the preprogrammed initial set-up after power-up. It then can be changed by the transmit level ARROW-UP and DOWN command keys. FINE STEP LEVEL adjustment is controlled by the U48 (multiplying DAC converter) when the keys are pushed once or in successive strokes. When pressed a certain length of time, U46 XAT1 and 2 will kick in and result in a continual auto-step speed change every decade. The controlled signal is now called XMITOUT. It is fed to the LIU circuit for transmission to the 310 jacks and other connecting terminations. DC blocking capacitors C3 and C4 are also added to the transmitting isolated induction transformer. By RCV/TRMT key command, U10 MUX selector can loop back the transmit signal to the receiver internally for true reading of transmit signal being sent out without upsetting the telephone line being measured.

6.9 AUTO-RANGING FREQUENCY COUNTER.

Between the Pre-gain stages, a converter processes the raw analog signal into TTL level signal,. Output SQUARE goes to programmable frequency divider (U63) so that output FRQOUT is auto-ranged sufficiently divided for accurate measuring by U38 timer input.

6.10 NOISE MEASURING MODES.

Using the FUNCTION select key and the operation program in ROM U81, the CPU U38 will control switches U13, and U23 to insert the selected preprogrammed filter stages between the auto-ranging gain amplifiers. The operation of the program, calibration constants and tables in the EEPROM and ROM, allow reading in dBrn to be directly displayed. With the span of the three gain ranging amplifiers, the 702 can possibly measure noise from weak signal lines as low as -80 dBm.

6.11 POWER SUPPLY.

A multiple output DC to DC converter module (PS1)with all the voltages required to operate the logics and analogs is used to power this model for easy replacement and trouble-shooting. Regulated or raw -48 Volts DC source is required to supply the system. An AC power converter on board for use in 120 or 220 Volts AC operation is also provided in most of 702B models.

SECTION 7 - TESTS AND CALIBRATION

7.0 702 ACCEPTANCE TEST PROCEDURE.

These steps verify proper operation and assure that the 702 will meet its published specifications.

1.0 EQUIPMENT REQUIRED

1.1 (1) Fluke 5200A Programmable AC Calibrator or equivalent.

1.2 (1) Fluke 8810A DMM or equivalent.

1.3 (1) Fluke 1900A Multi-Counter or equivalent.

1.4 (1) Sound Technology 1710A Distortion Measurement System or equivalent.

1.5 (1) Hewlett Packard 6294A DC Power Supply or equivalent.

1.6 (1 each) 600 Ohms, 900 Ohms shunt terminations.

1.7 (1) 600 Ohms series termination.

1.8 (1 each) 400 Ohms/2W resistor.

2.0 CONTINUITY

2.1 Power OFF the 702.

2.2 Set DMM to K Ohms/20M Ohms scale.

2.3 Verify that the Tip and Ring of the RECEIVE, TRANSMIT, and DIAL jacks are not connected to ground. (> 20M Ohms).

2.4 Set SMM to K Ohms/200 scale.

2.5 Verify that all pins on the rear panel terminal strip are connected to the proper jacks on the front panel. (< 10 Ohms).

2.6 Set the 702 power switch to ON.

3.0 HOLD CIRCUIT

3.1 Set the HOLD/OFF switch to HOLD.

3.2 Apply 46VDC through an external 400 Ohms resistor to the DIAL jack. Measure the current drawn. It should be 20 to 26 mA.

3.3 Reverse the polarity of the applied voltage. The current drawn should be same.

3.4 Increase the applied voltage to 53VDC. The current drawn should be same.

3.5 Set hold switch to OFF position and remove the applied voltage.

4.0 DC BLOCKING

4.1 Apply 48VDC across the RECEIVE jack. The DC current drawn must be OmA.

4.2 Apply 48VDC across TRANSMIT jack. The DC current drawn must be OmA.

4.3 Reverse polarity of applied voltage and repeat steps 4.1 and 4.2.

5.0 TRANSMIT LEVEL RANGE

5.1 Set the DMM to AC/Auto.

5.2 Power ON and set 702 TRANSMIT impedance to 600 Ohms.

5.3 Connect the 702 TRANSMIT jack to the DMM (600 Ohms shunt terminated).

5.4 Adjust the 702 LEVEL from -40.0dBm to +13.0dBm. Verify the following transmit levels on the DMM.

702 (dBm)	**DMM** (VAC)
+10.0	2.394 to 2.506
0.0	.7657 to .7836
-40.0	.0075 to .0080

6.0 SF SKIP MODE

6.1 Set SF SKIP active.

6.2 Starting with 1004Hz, increase the transmit frequency and make sure that all frequencies between 2450Hz to 2750Hz are skipped. Repeat decreasing the frequency from 2800Hz.

6.3 De-select SF SKIP mode.

7.0 TRANSMIT FREQUENCY RESPONSE

7.1 Set the transmit level (reference output) to 0.0dBm (.775VAC) at 1004Hz (600 Ohms).

7.2 Vary the frequency up/down keys and observe the following:

Frequency (Hz)	**Flatness** (VAC 600 Ohms)	(VAC 900 Ohms)	**Output vs Display** (dBm)
50	.731 to .820	.896 to 1.004	0.0 +/- .5
200	.757 to .793	.927 to .971	0.0 +/- .2
4K	.757 to .793	.927 to .971	0.0 +/- .2
15K	.757 to .793	.927 to .971	0.0 +/- .2
20K	.731 to .820	.896 to 1.004	0.0 +/- .5

7.3 Repeat paragraphs 7.1 and 7.2 for 900 Ohms termination (.948VAC). Return the 702 to 600 Ohms termination, 1004 Hz.

8.0 TRANSMIT 1004Hz

8.1 Set the transmit termination to 600 Ohms and frequency to 1004Hz. The frequency display should read 1004 +/- 1 Hz.

8.2 Adjust the 702 displayed transmit level to 0.0 dBm. The level measured into 600 Ohms should be between 0.7657 and 0.7836 Vrms.

8.3 Set the 702 transmit termination switch to 900 Ohms and shunt terminate the DMM with 900 Ohms.

8.4 Verify that the 702 level display did not change and that the DMM measures between .926VAC and .970VAC.

8.5 Return the transmit termination to 600 Ohms.

9.0 DISTORTION

9.1 Set 702 to 0.0dB (600 Ohms).

9.2 Connect 702 TRANSMIT to the 1710A input with 600 Ohms shunt termination.

9.3 Measure THD for the frequencies listed below:

FREQUENCY	THD
50	≤ 40
100	≤ 50
200	≤ 50
1004	≤ 50
3000	≤ 40
20000	≤ 40

10.0 TRANSMIT QUIET TERMINATION

10.1 Set transmit function switch to QUIET mode.

10.2 Measure the 702 output on the 1710A. It should be ≤ -70dB volts with the 30KHz/NOISE filter selected.

10.3 With the 702 display in TRANSMIT mode the frequency display should blank out and level display should show < -70 dBm.

10.4 De-select QUIET mode.

11.0 RECEIVE LEVEL

11.1 Set the 702 to RCV mode.

11.2 Connect the 5200A (600 Ohms series terminated) to the 702 RECEIVE jack.

11.3 Set the 5200A frequency to 1000Hz.

11.4 Vary the 5200A level and observe the following 702 RCV LEVEL measurements:

5200A Output (VAC)	5200A Output (dBm)	702 Level Display (dBm)
6.9199V	(+13.0)	+13.0 +/- .4
1.54919V	(0.0)	0.0 +/- .1
.489898V	(-10.0)	-10.0 +/- .2
.154919V	(-20.0)	-20.0 +/- .2
48.9898mV	(-30.0)	-30.0 +/- .2
15.4919mV	(-40.0)	-40.0 +/- .3
4.89898mV	(-50.0)	-50.0 +/- .4

11.5 Increase the 5200A output. As the output is increased, the 702 level display sould blank out at some level between +10.0 and +11.0 dBm.

11.6 Decrease the 5200A output. The 702 level display should return to ≤ +10.0 dBm.

11.7 Return the 5200A output to 1.54919VAC (0.0dBm).

11.8 Set the 702 termination pushbutton to 900 Ohms. Verify that the level drops by 0.2 +/- .1dB. Return the pushbutton to the 600 Ohms position.

11.9 Set the 702 pushbutton to BRDG and observe that the level increases by 6.0 +/- .2dB. Return the pushbutton to TERM.

12.0 RECEIVE FREQUENCY RESPONSE

12.1 Set the 5200A to 1.54919VAC (0.0dBm).

12.2 Vary the 5200A frequency from 50Hz to 20KHz. Verify the 5200A output frequency by using the 1900A frequency counter. The frequency response should be as follows:

5200A Frequency (Hz)	702 Level Display (dBm)	702 Frequency Display
50	0.0 +/- .5	50Hz +/- 1
200	0.0 +/- .2	200Hz +/- 1
15K	0.0 +/- .2	15KHz +/- .01
20k	0.0 +/- .5	20KHz +/- .01

12.3 Set the 5200A to 4.89898mV (-50.0 dBm).

12.4 Set the 5200A to 1004Hz.

12.5 When connected to 5200, the 702 frequency should measure 1004 +/- 1.

13.0 RECEIVE NOISE MEASUREMENT

13.1 Set the 702 function switch to CMSG.

13.2 Set the 5200A frequency to 1004Hz. Vary the 5200A level observing the following:

5200A Level (VAC)	5200A Level (dBm)	702 NOISE Display (dBm)
1.54919V	(0.0)	90+/-1
.489898V	(-10.0)	80+/-1
.154919V	(-20.0)	70+/-1
48.9898mV	(-30.0)	60+/-1
15.4919mV	(-40.0)	50+/-1
4.89898mV	(-50.0)	40+/-1
1.54919mV	(-60.0)	30+/-1
.489898mV	(-70.0)	20+/-1

14.0 RECEIVE NOTCH FILTER

14.1 Set the 702 function switch to NOTCH.

14.2 Set the 5200A level to 1.54919VAC (0.0 dBm). Vary 5200A frequency from 995Hz to 1025Hz.

14.3 The 702 NOTCH display should read ≤ 40 dBrn for all frequencies.

14.4 Set the 5200A frequency to 1300Hz.

14.5 The 702 NOTCH display should read 90 +/-1dBrn.

15.0 S/N RATIO

15.1 Set the 702 function to S/N RATIO.

15.2 Set the 5200A level to 1.54919VAC (0.0dBm) to 1004Hz.

15.3 The 702 should display S/N > 50.

16.0 NOISE MEASUREMENT ACCURACY

16.1 Set the 702 function to 3K.

16.2 Set the 5200A frequency to 1004Hz. Vary level and observe the following:

5200A (VAC)	5200A (dBm)	702 NOISE Display (dBm)
1.54919V	(0.0)	90+/-1
.489898V	(-10.0)	80+/-1
.154919V	(-20.0)	70+/-1
48.9898mV	(-30.0)	60+/-1
15.4919mV	(-40.0)	50+/-1
4.89898mV	(-50.0)	40+/-1
1.54919mV	(-60.0)	30+/-1
.489898mV	(-70.0)	20+/-1

17.0 RECEIVE NOISE WEIGHTING FILTERS

17.1 Set the 702 function switch to CMSG.

17.2 Set the 5200A level to 1.54919VAC.

17.3 Vary the 5200A frequency to verify the following measurements:

5200 FREQUENCY (Hz)	CMSG (dBm)
400	79+/-1
1000	90+/-1
3000	87+/-2
4000	75+/-3

17.4 Set 702 to 3K mode.

17.5 Vary the 5200A frequency and verify the following:

5200 FREQUENCY (Hz)	3K (dBm)
400	90+/-1
1000	90+/-1
3000	87+/-2
6000	78+/-2

18.0 RECEIVE NOISE FLOOR

18.1 Disconnect all inputs to the 702.

18.2 Set the 702 to CMSG, 600 Ohms term.

18.3 The frequency display should blank out.

18.4 The level display should show under range with only the "-" sign and the rest blanked out.

19.0 XFR SWITCH

19.1 Loopback the 702 TRANSMIT to RECEIVE.

19.2 Set TRANSMIT level to 0.0dBm at 1004Hz.

19.3 Set 702 to RECEIVE mode.

19.4 The 702 should read 0.0 +/- 0.1dBm at 1004 +/-1Hz.

19.5 Disconnect all patch cords.

19.6 Set transfer switch to XFR and RCV/TRMT to RCV.

19.7 Apply a tone of 0.0dBm at 1000Hz to the TRANSMIT jack.

19.8 The 702 should read 0.0dBm +/- .1dB at 1000Hz.

19.9 Return XFR/NORM switch to NORM.

20.0 SPEAKER OPERATION

20.1 Set the 702 to 0.0dBm at 1000Hz in TRMT mode.

20.2 Turn the Speaker VOLUME pot from minimum to maximum (clockwise) and verify an increase in loudness with no break-up.

20.3 Vary the level (1004Hz mode) from -40.0dBm + 13.0 dBm. Verify no break-up.

20.4 Vary the frequency from 50Hz to 4000Hz. Verify no break-up.

20.5 Return the 702 VOLUME pot to minimum and verify no output from the speaker.

21.0 MECHANICAL INSPECTION

21.1 Verify that all switches, pushbuttons and knobs function properly.

21.2 Verify that all LED's and displays are properly aligned.

21.3 Verify that all terminal blocks on the 702 rear panel are not broken.

7.1 702 TESTING AND CALIBRATION.

The purpose of this section is to speed up functional testing of the 702 front panel and main board assemblies. A collection of EPROM-based routines that will exercise all functional blocks of the assemblies being tested, so that the acceptability of each block may be determined.

Test Equipment required:

Serial ASCII terminal, 9600 bps, 8 data, 1 stop, no parity

Sound Technology 1710A Distortion measurement analyzer

6010-1702-15 (optional- makes it easier to apply test signals to P3 on 8000-1702-11)

Reference Documents:

SD-1702-11	ED-1702-11	8000-1702-11
SD-1702-13	ED-1702-13	8000-1702-13
	SW-7702-04	

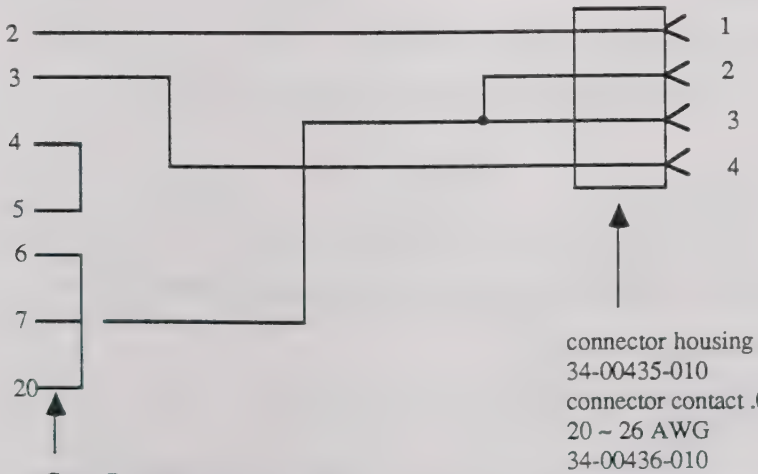
7.2 RS-232C SERIAL ADAPTER.

Before the calibration or block testing can begin, you need to build an RS-232C adaptor to connect the terminal to the 702 board's P7 header serial port. *Assembled RS-232C serial adapter will be available some time later.

All parts are available in any Electronics stores and are also available from the CXR Service Department.

Parts needed are:

1 pc	Connector housing plug 4 position, .1 sp.	P/N 34-00435-010
4 pcs	Connector contact .025 SQ, female, for 20-26AWG	P/N 34-00436-010
1 pc	D-type receptacle, 25 position RA PC .318	P/N 34-00425-020
wires	any stranded wire 22 to 26 AWG can be used, limit the length to 2 feet.	



Cou - D receptacle 25 pos RA PC -318
P/N 34-00425-020 or
any standard DB-25 female connector

connector housing plug 4 pos - 1 sp
34-00435-010
connector contact .025 sq, female
20 ~ 26 AWG
34-00436-010
Use a stranded wire 22 ~ 26 AWG
maximum 1 length 2' ft

Figure 7-1: RS-232C Serial adapter circuit diagram.

* Assemble the circuit shown above. Keep the assembled adaptor forfuture uses.

7.3 TESTING AND CALIBRATING THE 702 WITH REVISION 1.52 FIRMWARE.

To start the calibration or block testing, make sure the calibration jumper (E9) is not connected. Turn off the 702 power. Connect the cal jumper. Turn on the 702 power. The 702 should sign on with the calibration menu.

If you press H [RETURN], two items have been added to the calibration HELP menu: 'M' and 'D'. 'M' calls the 6303 monitor; 'D'calls the TMS320 debugger. This means that you can use the same EPROM both for board functional test and for calibration.

If you're doing 702 board functional test, just power up the 702 with the cal jumper connected (as explained above), then key in:

M [RETURN]

The 6303 monitor will sign on, and you can proceed with the test. (The cal jumper should be removed while you're doing the board test.)

When you get to the end of the functional test, you can get back to the calibration routine by 1) putting the cal jumper back in, then 2) typing G8000[RETURN].

Combined Board Assembly Tests for 8000-1702-11 and 8000-1702-13

Setup:

(1) Power down the 702.

(2) Connect a serial terminal (9600 bps, 8 data, 1 stop, no parity) to the 702 at P7.

(3) Load the 702 test EPROM (checksum CCD1) in the U81 socket. (If another kind of EPROM is present at U81, set it aside.)

(4) If you are going to do front panel tests, connect the front panel to the main board.

(5) Turn on the 702 power.

(6) The 702 will sign on at the terminal with this message:

MONITOR-6303 for 702 V1.3X (c) 1987 CXR/Telcom Corporation

1	LED test	3	keyswitch test
2	numeric display test	4	1702-11 test

(7) Select a test by pressing the number, then [RETURN].

(8) For details about using each of the four tests, see the instructions that follow this page:

LED test.....page 4
keyswitch test.....page 6
numeric display test.....page 5
1702-11 test.....page 8 - 13

(9) When you have finished the tests, power down the 702. Remove the test EPROM and put it away in a safe place (on conductive foam or in a section of antistatic I.C. tubing.)

8000-1702-13 LED TEST

(1) To do the LED test, key in 1[RETURN] at the terminal.

(2) The LEDs in the front panel will all turn off. The digit displays will all be set to "0", all the decimal points will be lighted, and the "+" and "-" signs of DS1 will be lighted.

(3) The LEDs will blink from off, to on, to off, one at a time. The blink order is top to bottom, left to right, starting at the "600" LED on the receive side, ending at the "900" LED on the transmit side. The exact blink sequence is:

Schematic Designator	Label on Front Panel	Remarks
DS11	600	
DS10	900	
DS13	TERM	
DS12	BRDG	
DS15	XFER	
DS14	NORM	
DS20	LEVEL (dBm)	
DS19	CMSG (dBm)	
DS18	NOTCH (dBm)	
DS17	S/N (dB)	
DS16	3K (dBm)	
DS1	(plus sign)	winks on / off /on
DS1	(minus sign)	winks on / off / on
DS22	RCV	
DS21	TRMT	
DS26	SLOPE	
DS25	STEP	
DS24	TUNE	
DS23	QUIET	
DS27	SF SKIP	
DS29	600	
DS28	900	

(4) When you have seen all the LEDs blink correctly, you can go back to the sign-on message by pressing a key at the terminal.

8000-1702-13 NUMERIC DISPLAY TEST

(1) To do the numeric display test, key in 2[RETURN] at the terminal.

(2) The LEDs in the front panel will all turn off. The digit displays will all be set to "0", all the decimal points will be lighted, and the "+" and "-" signs of DS1 will be lighted.

(3) Starting with DS9 (the rightmost digit on the panel) the digits will count from 0 to 9.

(4) When DS3 changes from 9 to 0, and DS2 begins counting, all the decimal points will turn off.

(5) When DS2 changes from 9 to 0, the decimal points in DS3, DS5, and DS6 will count in this sequence:

Sequence #	DS3	DS5	DS6
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1
8	0	0	0
9	0	0	1
0	1	1	1

(6) At this point, the whole thing repeats.

(7) When you have seen all the numeric displays operate correctly, you can go back to the sign-on message by pressing a key at the terminal.

8000-1702-13 KEYSWITCH TEST

(1) To do the keyswitch test, key in 3[RETURN] at the terminal.

(2) The key switches are arranged like this:

S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12

(3) Each time you press one of the key switches on the 702 front panel assembly, its number should appear on the terminal's CRT. The number should appear once for each keystroke.

(4) If a key doesn't pop up as soon as you release it, it should be replaced.

(5) When you have seen all the key switches operate correctly, you can go back to the sign-on message by pressing a key at the terminal.

8000-1702-11 BOARD TEST

(1) To start the 1702-11 test, key in 4[RETURN] at the terminal.

(2) This EPROM-based test does the same things as the manual 8000-1702-11 test, except that it automatically enters most of the E[ADDRESS] keystrokes. Numbers in the square brackets [#], are the numbers on the manual test that corresponds to the message that you'll see on the terminal screen.

(3) To run the test, just do what the prompt says. Press a key to go the the next prompt. If you want to start over again, press "Q" to get back to the test selection menu.

[step #]	Screen Message
[6]	Connect 0 dBm to P3/2 and P3/4. Signal at U29/1 s/b 2.2 Vpk TP2 to GND s/b 1.5 vdc [Q] to quit, any other key to continue
[8]	Signal at U29/1 s/b 0.5 Vpk TP2 to GND s/b 0.38 vdc [Q] to quit, any other key to continue

[step #]	Screen Message
[10]	Signal at U29/1 s/b 0.8 Vpk TP2 to GND s/b 0.61 vdc [Q] to quit, any other key to continue
[12]	U2/1 should be LOW; is low (?) U2/7 should be LOW; is low (?) U31/1 should be LOW; is low (?) U31/7 should be LOW; is low (?) [Q] to quit, any other key to continue

NOTE

The "should be" section is what the test wants to see; the "is" section is what the processor senses. To be certain of the result, check the comparator output levels with your scope probe.

[13]	Set imput to +14.0 dBm [Q] to quit, any other key to continue U2/1 should be HIGH; is high (?) U2/7 should be LOW; is low (?) U31/1 should be HIGH; is high (?) U31/7 should be LOW; is low (?) [Q] to quit, any other key to continue
[14]	Set input to -10.0 dBm U2/1 should be LOW; is low (?) U2/7 should be HIGH; is high (?) U31/1 should be LOW; is low (?) U31/7 should be HIGH; is high (?) [Q] to quit, any other key to continue
[15,16]	Set input to -6.0 dBm Signal at U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue
[18]	Signal to U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[19]	Set input to -26.0 dBm Signal at U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue

[step #]	Screen Message
[21]	Signal at U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[22,23]	Set input to -46.0 dBm Signal at U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue
[25]	Signal at U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[26,27]	Set input to -66.0 dBm Signal at U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue
[29]	Signal at U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[30,31]	Set input to -76.0 dBm TP2 to GND s/b 0.6 vdc [Q] to quit, any other key to continue
[33,34]	Set input to -6.0 dBm Signal at U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[35,36]	Set input to -26.0 dBm Signal to U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue
[38]	Signal at U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[39,40]	Set input to -46.0 dBm Signal at U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue

[step #]	Screen Message
[42]	Signal at U29/1 s/b 2.6 Vpk TP2 to GND s/b 1.9 vdc [Q] to quit, any other key to continue
[43]	Set input to -66.0 dBm Signal at U29/1 s/b 0.26 Vpk TP2 to GND s/b 0.19 vdc [Q] to quit, any other key to continue
[46]	Set input to 1.0 KHz, +15.0 dBm Adjust input level for 1.73 vdc at TP2 Verify TP2 voltage for the frequencies listed in step 47. [Q] to quit, any other key to continue

C-message Filter Response

Frequency	Voltage Range		Nominal
100 Hz	< 25 mVac		
200	0.077 to	0.122	0.097
300	0.206	0.326	0.259
400	0.415	0.522	0.466
600	0.898	1.130	1.007
800	1.297	1.630	1.456
1000	****	****	1.730
1200	1.507	1.897	1.691
1500	1.374	1.730	1.542
2000	1.328	1.671	1.490
2500	1.312	1.652	1.472
3000	1.030	1.633	1.297
3500	0.573	0.908	0.721
4000	0.231	0.460	0.326
5000	0.046	0.092	0.065

[step #] Screen Message

[49] Set input to +13.0 dBm
Verify TP2 voltage for the frequencies listed in step 49

[Q] to quit, any other key to continue

NOTE: The voltage at TP2 should be about 1.7 vac. adjust the input level to set the TP2 level to 1.73 vac, then check the level at the other frequencies listed in the following table:

3 KHz Flat Filter Response

Frequency	Voltage Range			Nominal
400	1.636	to	1.836	1.733
1000	*****		*****	1.730
2000	1.499		1.887	1.682
3000	0.997		1.508	1.226
6000	0.298		0.594	0.420

[51,52] Set input to 1004 Hz, +15.0 dBm
Adjust input level for 1.73 vdc at TP2

[Q] to quit, any other key to continue

[54] Verify TP2 voltage for the frequencies listed in step 54

[Q] to quit, any other key to continue

1010 Hz Notch Reposnse

Frequency	TP2 Voltage
600	about 0.9
800	about 1.17
900	about 0.84
995	< 5 mVac
1007	< 5 mVac
1022	< 5 mVac
1025	< 5 mVac
1200	about 1.25
2000	about 1.47

[55,56] Here comes the TMS monitor (step 56)

[Q] to quit, any other key to continue

NOTE

From here on, you'll have to key in the memory change values manually.

(4) The screen message will be:

TMS320 Debug Monitor V1.11 05/14/1987 (c) CXR/Telcom
(ENTER H TO GET HELP)

(5) Key in :E20[RETURN]

The screen message will be: 0020: XXXX

(6) Key in :0006[RETURN]

(7) Key in :E21[RETURN]

The screen message will be: 0021: XXXX

(8) Key in :B17E[RETURN]

(9) Key in :X[RETURN]

(10) The signal between P4/4 and P4/2 should be a 1004 Hz)+/ 0.1 Hz) sinewave, 2.2 Vpk, harmonic distortion < -60 dB. (30 KHz LPF in circuit).

END OF BOARD TEST

The Manual 1702-11 Procedure

1. Power up

2. Prompt on screen, " MONITOR 6303 FOR 702B..."

3. Enter from the keyboard E5000[RETURN]
   the screen will show 5000:00
   Enter 00[RETURN]

4. Enter from the keyboard E5100[RETURN]
   the screen will show 5100:00
   Enter 00[RETURN]

5. Enter from the keyboard E5200[RETURN]
   the screen will show 5200:00
   Enter 00[RETURN]

6. a. Set the 1710A to 600 ohm, 0.0 dBm, 1000 Hz. Connect the 1710A generator output to the 1702-11 at P3/2 and P3/4.

   b. Connect the 'scope to U29/1. The signal should be a 1 KHz sinewave, 4.4 Vpp.

   c. The d.c. voltage at TP2 relative to TP4 should measure 1.5 vdc.

7. Enter from the keyboard E5100[RETURN]
   the screen will show 5100:00
   Enter 02[RETURN]

8. a. The signal at U29/1 should be a 1 KHz sinewave, 1.2 Vpp.

   b. The d.c. voltage at TP2 relative to TP4 should measure 0.38 vdc.

9. Enter from the keyboard E5100[RETURN]
   the screen will show 5100:00
   Enter 06[RETURN]

10. a. The signal at U29/1 should be a 1 KHz sinewave, 1.6 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.61 vdc.

11. Enter from the keyboard E5100[RETURN]
    the screen will show 5100:00
    Enter 02[RETURN]

12. Set the signal input to 0.0 dBm.
    a. U2 pin 1 should be LOW (digital 0)
    b. U2 pin 7 should be LOW (digital 0)
    c. U31 pin 1 should be LOW (digital 0)
    d. U31 pin 7 should be LOW)digital 0)

13. Set the signal input to +15.0 dBm.
    a. U2 pin 1 should be HIGH (digital 1)
    b. U2 pin 7 should be LOW (digital 0)
    c. U31 pin 1 should be HIGH (digital 1)
    d. U31 pin 7 should be LOW (digital 0)

14. Set the signal input to -10.0 dBm.
    a. U2 pin 1 should be LOW (digital 0)
    b. U2 pin 7 should be HIGH (digital 1)
    c. U31 pin 1 should be LOW (digital 0)
    d. U31 pin 7 should be HIGH (digital 1)

15. Set the input signal to -6.0 dBm.

16. a. The signal at U29/1 should be a 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

17. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 01[RETURN]

18. a. The signal at U29/1 should be 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to Tp4 should measure 1.9 vdc.

19. Set the input level to -26.0 dBm.

    a. The signal at U29/1 should be 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

20. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 02[RETURN]

21. a. The signal at U29/1 should be a 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 1.9 vdc.

22. Set the input level to -46.0 dBm.

23. a. The signal at U29/1 should be a 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

24. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 03[RETURN]

25. a. The signal at U29/1 should be 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 1.9 vdc.

26. Set the input level to -66.0 dBm.

27. a. The signal at U29/1 should be a 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

28. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 07[RETURN]

29. a. The signal at U29/1 should be a 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 1.9 vdc.

30. Set the input level to -76.0 dBm.

31. a. The d.c. voltage at TP2 relative to TP4 should measure 0.6 vdc.

32. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 08[RETURN]

33. Set the input level to -6.0 dBm.

34. a. The signal at U29/1 should be a 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 1.9 vdc.

35. Set the input level to -26.0 dBm.

36. a. The signal at U29/1 should be a 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

37. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 10[RETURN]

38. a. The signal at U29/1 should be a 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 1.9 vdc.

39. Set the input level to -46.0 dBm.

40. a. The signal at U29/1 should be a 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

41. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 18[RETURN]

42. a. The signal at U29/1 should be a 1 KHz sinewave, 5.2 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 1.9 vdc.

43. Set the input level to -66.0 dBm.

44. a. The signal at U29/1 should be a 1 KHz sinewave, 0.52 Vpp.

    b. The d.c. voltage at TP2 relative to TP4 should measure 0.19 vdc.

45. Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 00[RETURN]

    Enter from the keyboard E5200[RETURN]
    the screen will show 5200:00
    Enter 01[RETURN]

46. Set the input level to +15.0 dBm.

47. The d.c. voltage at TP2 relative to TP4 for each of the following frequencies should closely match the values given below:

Freq.	Voltage	CMSG FILTER
100	< 25 mv.	
200	90 mv.	
300	0.25 v	
400	0.47 v	
600	0.99 v	
800	1.46 v	
1000	1.73 v	
1200	1.77 v	
1500	1.65 v	
2000	1.51 v	
2500	1.5 v	
3000	1.4 v	
3500	0.77 v	
4000	0.37 v	
5000	75 mv	

48. Enter from the keyboard E5000[RETURN]
the screen will show 5000:00
Enter 03[RETURN]

49. Set the input level to +13.0 dBm. The d.c. voltage at TP2 relative to TP4 for each of the following frequencies should closely match the values given below:

Freq.	Voltage	3KHZ FILTER
400	1.65 v	
1000	1.7 v	
2000	1.55 v	
3000	1.20 v	
6000	.040 v	

50. Enter from the keyboard E5000[RETURN]
the screen will show 5000:00
Enter 01[RETURN]

51. Set the input level to +15.0 dBm, 1004 Hz.

52. The d.c. voltage at TP2 relative to TP4 should measure 1.73 vdc.

53. Enter from the keyboard E5000[RETURN]
the screen will show 5000:00
Enter 05[RETURN]

54. The d.c. voltage at TP2 relative to TP4 for each of the following frequencies should closely match the values given below:

Freq.	Voltage	CNOTCH FILTER
600	0.9 v	
800	1.17 v	
900	0.84	
995	< 5 mvdc	
1004	< 5 mvdc	
1025	< 5 mvdc	
1200	1.25 v	
2000	1.47 v	

55. Enter from the keyboard E5000[RETURN]
the screen will show 5000:00
Enter 00[RETURN]

Enter from the keyboard E5100[RETURN]
the screen will show 5100:00
Enter 02[RETURN]

Enter from the keyboard E5200[RETURN]
the screen will show 5200:00
Enter 00[RETURN]

56. Enter from the keyboard GD480[RETURN]
the screen will show "TMS320 DEBUG MONITOR..."

Enter from the keyboard E20[RETURN]
the screen will show 0020:xxxx
Enter 0006[RETURN]

Enter from the keyboard E21[RETURN]
the screen will show 0021:xxxx
Enter B17E[RETURN]

Enter X[RETURN]

57. The signal across P4/2 -- P4/4 should be a 4.4 Vpp sinewave, 1004 Hz, < -60 dB distortion.

END OF TEST

EQUATES TABLE TO SUPPORT BOARD TEST

port 1 bit masks

```
under       equ     $01
over        equ     $02
1 under     equ     $04
1 over      equ     $08
kbdav       equ     $10
stav        equ     $20
cal         equ     $40
busy        equ     $80

fltprt      equ     $5000   * to U52
filtr1      equ     $01
filtr2      equ     $02
notch       equ     $04
f60hz       equ     $08
frq1        equ     $10
frq2        equ     $20
frq3        equ     $40
frq4        equ     $80

rlyprt      equ     $5100       * to U60
normx       equ     $01         * 0 = norm          1 = xfr
brdg        equ     $02         * 0 = brdg          1 = term
r600        equ     $04         * 0 = 600           1 = 900
x600        equ     $08         * 0 = 600           1 = 900
ntognd      equ     $10         * 0 = rcv & dial sleeves float
                                  1 = rcv & dial sleeves grounded
rtnlos      equ     $20         * 0 = balance capacitor C7 shorted to GND
                                  1 = C7 in termination path
```

```
xf1     equ     $40
xf2     equ     $80

xf2     xf1     1pf selected by mux U40
0       0       36 KHz 4 pole (U41)
0       1       9  KHz 4 pole (U42)
1       0       ?? KHz 2 pole (U50A)
1       1       ?? KHz 2 pole (U50B)

gnport          equ     $5200   * to U61
gain1           equ     $01
gain2           equ     $02
gain3           equ     $04
gain4           equ     $08
gain5           equ     $10
liu1            equ     $20
liu2            equ     $40
liu3            equ     $80

hibyte  equ     $5400   * actually, high nibble + overrange bit
lobyte  equ     $5300   * low byte from ADC

daclo   equ     $5800   * daclo and dachi control the transmitter
dachi   equ     $5801   * attenuator, U48 and U46.

u95     equ     $5900
u96     equ     $5901
u97     equ     $5902
u98     equ     $5903
u99     equ     $5904
u93     equ     $5905
u94     equ     $5906

kbrd    equ     $5a00
```

702 Calibration / preliminary / 20 May 1987-

Make sure the a.c. power is NOT connected.

Make sure there is NO jumper on E9.

Connect the front panel to the main board.

Connect the two (receive and transmit) signal cable assemblies.

Plug in the calibration EPROM, "CSW702b V1.30 May 20, 1987".

Plug the EEROM into U83.

Connect the 702 to the data terminal.

Connect a.c. power to the 702, and turn on the a.c. power switch.

The 702 will sign on at the terminal:

MONITOR-6303 for 702 V1.3 (c) 1987 CXR/telcom Corpopration

Adjust R85 for 4.25 vdc @ TP4.

Adjust R87 for 2.125 vdc @ TP3.

[Put the cal jumper on E9, and type 58000 to start the calivration routine.]

G8200

CXR/Telcom 702 Transmission Measurement Set V1.30 05/20/1987
(NOTE: Install jumper to go in to calibration mode)

*** CALIBRATION NOT COMPLETE. CALIBRATE ALL ***

**** LEVEL NOT CALIBRATED ****
**** FILTER NOT CALIBRATED ****
**** POST GAIN NOT CALIBRATED ****
**** TRASMITTER NOT CALIBRATED ****
**** FEED BACK NOT CALIBRATED ****

CXR/telcom 702B Auto Calibration
(WARNING: DO NOT POWER OFF WITH CALIBRATION JUMPER IN)

MODE (Enter H for Help) **H**

H	for help
L	for level
F	for filter
P	for post gain
T	for transmitter
B	for feed back measurement

CXR/telcom 702B Auto Calibration
(WARNING: DO NOT POWER OFF WITH CALIBRATION JUMPER IN)

MODE (Enter H for Help) **L**

CONNECT 26 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT 14 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT 14 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -6 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -6 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -26 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -26 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -46 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -46 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -66 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -66 dBm
You may enter any value you have set
Press [RETURN] when you are ready
CONNECT -86 dBm
You may enter any value you have set
Press [RETURN] when you are ready
Connect 0 dBm at 1000 Hz and source ipedance 600 ohms and press [RETURN]
Connect 0 dBm at 1000 Hz and source impedance 900 ohms and press [RETURN]

[at this point you could set the 1710A to +0.2 dBm at 600 ohms, then press RETURN]

MODE (Enter H for Help) **F**

Connect 0 dBm at 1000 Hz and press [RETURN]
Connect 0 dBm at 1200 Hz and press [RETURN]
Connect 0 dBm at 2000 Hz and press [RETURN]

MODE (Enter H for Help) **P**

CONNECT -6 dBm. Freq 1000 Hz and Impedance 600 ohms
Press [RETURN] when you are ready
CONNECT -26 dBm. Freq 1000 Hz and Impedance 600 ohms
Press [RETURN] when you are ready
CONNECT -46 dBm. Freq 1000 Hz and Impedance 600 ohms
Press [RETURN] when you are ready

MODE (Enter H for Help) **T**

Loop back receive and transmit by an external cable and press [RETURN]
Premove loop back and press [RETURN]

MODE (Enter H for Help) **B**

[The "B" choice doesn't show any activity on the 702 front panel or the terminal, and takes a few minutes to finish. It may seem like nothing is happening, but don't worry about it.]

MODE (Enter H for Help)

Remove the jumper from E9.

[Now hit [ESC] to run the 702 in measurement mode.]

Turn off a.c. power to the 702.

Remove the monitor EPROM.

(Leave the EPROM in place.)

Remove the connection from the data terminal.

Leave the signal cable assemblies in place. (Each 702 gets calibrated with its own signal cables.)

END OF CALIBRATION.

PARENT PART: 6010-1702-14		CABLE ASSY-TRANSMIT, 702B		
REF. PAGE C-14				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2100-0204-01	CON-TELEPHONE JACK 3 OPEN CIRCUIT	J1	EA	1
2101-0017-06	CON-HOUSING RECEPTACLE 6 POS. 156	J2	EA	1
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP1	EA	6
2101-0032-02	CON-CABLE SHIELD .470 TIN YELLOW	MP2	EA	2
2103-0008-01	TERMINAL-RECEPTACLE .205X.032 INS.	MP3	EA	2
2802-0023-00	TERMINAL-LUG SOLDER #6 HOLE LOCKING	MP6	EA	2
6000-0100-00	WIRE-BT 24 AWG 7X32 BLACK	W1	FT	0.3
6000-0120-00	WIRE-BT 24 AWG 7X32 RED	W2	FT	0.3
6000-0200-05	WIRE-BT 22 AWG 7X30 GREEN	W3	FT	0.4
6001-0615-00	CABLE-2 COND, 22AWG,SHIELD,300V	W4,5	FT	1.8
6002-0006-00	TUBING-HEAD SHRINK 1/4' BLACK	MP4	FT	0.2
6002-0125-00	CABLE-TIE MARKER .75' DIA	MP5	EA	1
ED-1720-14	CABLE ASSY-TRANSMIT, 702B	REF	EA	0

PARENT PART: 6010-1702-15	CABLE ASSY-RECEIVE/HOLD, 702B			
REF. PAGE C-12				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2100-0201-01	CON-TELEPHONE JACK 2 CLOSED CIRCUIT	J2	EA	1
2100-0204-01	CON-TELEPHONE JACK 3 OPEN CIRCUIT	J1	EA	1
2101-0017-05	CON-HOUSING RECEPTACLE 5 POS .156	J3	EA	1
2101-0017-08	CON-HOUSING RECEPTACLE 8 POS .156	J4	EA	1
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP1	EA	13
2101-0032-02	CON-CABLE SHIELD .470 TIN YELLOW	MP2	EA	4
2103-0008-01	TERMINAL-RECEPTACLE .205X.032.INS.	MP3	EA	3
2802-0023-00	TERMINAL-LUG SOLDER #6 HOLD LOCKING	MP7	EA	2
6000-0100-00	WIRE-BT 24 AWG 7X32 BLACK	W9	FT	0.3
6000-0120-00	WIRE-BT 24 AWG 7X32 RED	W10	FT	0.3
6000-0200-05	WIRE-BT 22 AWG 7X30 GREEN	W8	FT	0.7
6000-0200-09	WIRE-BT 22 AWG 7X30 WHITE	W5-7	FT	3
6001-0615-00	CABLE-2 COND,22AWG,SHIELD,300V	W1-4	FT	4
6002-0006-00	TUBING-HEAT SHRINK 1/4' BLACK	MP4	FT	0.6
6002-0120-00	CABLE-TIE .75' DIA	MP5	EA	4
6002-0125-00	CABLE-TIE MARKER .75' DIA	MP6	EA	1
ED-1702-15	CABLE ASSY-RECEIVE/HOLD,702B	REF	EA	0

PARENT PART: 6010-1702-16		CABLE ASSY-AC POWER, 702B		
REF. PAGE C-3				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2100-0520-06	TERMINAL-RT #6 16-22AWG INS. RED	MP1		
2101-0017-05	CON-HOUSING RECEPTABLE 5 POS .156	J1		
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP2		
2101-0050-01	CON-FUSED VOLTAGE SELCTOR & FILTER	J2		
5100-0201-00	SW-TOGGLE SPDT FLAT BAT SOLDER	S1		
6000-0400-00	WIRE-BT 18 AWG 7X26 BLACK	W4		
6000-0420-00	WIRE-BT 18 AWG 7X26 RED	W1,2		
6000-0450-00	WIRE-BT 18 AWG 7X26 GREEN	W3		
6002-0004-00	TUBING-HEAD SHRINK 1/8" BLACK	MP3		
6002-0120-00	CABLE-TIE .75" DIA	MP4		
6002-0125-00	CABLE-TIE MARKER .75" DIA	MP5		
ED-1702-16	CABLE ASSY-AC POWER, 702B	REF		

PARENT PART: 6010-1702-17		CABLE ASSY-DC POWER, 702B		
REF. PAGE C-4				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2100-0033-00	TERM-BLOCK,3 POS,3/8SP,PNL MT	TB1	EA	1
2100-0520-06	TERMINAL-RT #6 16-22 AWG INS. RED	MP1	EA	1
2101-0017-05	CON-HOUSING RECEPTACLE 5 POS .156	J1	EA	1
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP3	EA	2
5100-0201-00	SW-TOGGLE SPDT FLAT BAT SOLDER	S1	EA	1
5101-0104-00	FUSEHOLDER-HLT, PC/PNL MT,VERT,GMT	FH1	EA	1
6000-0491-00	WIRE-BT,18 AWG,16X30,BLK,(UL/CSA)	W1-3	FT	3
6000-0491-02	WIRE-BT,18 AWG,16X20,RED,(UL/CSA)	W4	FT	0.5
6000-0491-05	WIRE-BT,18 AWG,16X30,GRN,(UL/CSA)	W5	FT	0.5
6002-0004-00	TUBING-HEAD SHRINK 1/8" BLACK	MP2	FT	0.4
6002-0120-00	CABLE-TIE .75" DIA	MP4	EA	3
6002-0125-00	CABLE-TIE MARKER .75" DIA	MP5	EA	1
ED-1702-17	CABLE ASSY-DC POWER,702B	REF	EA	0

PARENT PART: 6010-1702-18		CABLE ASSY-FRONT PANEL 1/F, 702B		
REF. PAGE C-15				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2101-0038-01	CON-IDC RECEPTACLE 40 POS 26-30 AWG	J1,2	EA	2
6001-0005-08	CABLE-FLAT .050 SP 40X28 AWG 7X36	W1	FT	0.3
ED-1702-18	CABLE ASSY-FRONT PANEL I/F,702B	REF	EA	0

PARENT PART: 6010-1702-19	CABLE ASSY-VOLUME CONTROL, 702B			
REF. PAGE C-17				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2101-0017-03	CON-HOUSING RECEPTACLE 3 POS .156	J1	EA	1
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP1	EA	3
2101-0032-02	CON-CABLE SHIELD .470 TIN YELLOW	MP2	EA	2
4751-0050-01	R-VAR PNL 1T 10K OHM 20% 1/2W	R1	EA	1
6000-0200-05	WIRE-BT 22 AWG 7X30 GREEN	W1,3	FT	0.3
6001-0615-00	CABLE-2 COND,22AWG,SHIELD,300V	W2	FT	0.3
6002-0004-00	TUBING-HEAD SHRINK 1/8" BLACK	MP3	FT	0.2
6002-0125-00	CABLE-TIE MARKER .75" DIA	MP4	EA	1
ED-1702-19	CABLE ASSY-VOLUME CONTROL, 702B	REF	EA	0

PARENT PART: 6010-1702-20		CABLE ASSY-CHASSIS GND, 702B		
REF. PAGE C-18				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2100-0520-06	TERMINAL-RT #6 16-22 AWG INS. RED	MP1	EA	2
6000-0450-00	WIRE-BT 18 AWG 7X26 GREEN	W1	FT	0.4
ED-1702-20	CABLE ASSY-CHASSIS GND, 702B	REF	EA	0

PARENT PART: 6010-1702-21		CABLE ASSY-HOLD SWITCH, 702B		
REF. PAGE C-16				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2101-0017-02	CON-HOUSING RECEPTACLE 2 POS .156	J1	EA	1
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP1	EA	2
5100-0201-00	SW-TOGGLE SPDT FLAT BAT SOLDER	S1	EA	1
6000-0100-00	WIRE-BT 24 AWG 7X32 BLACK	W1	FT	0.3
6000-0110-00	WIRE-BT 24 AWG 7X32 BROWN	W2	FT	0.3
6002-0004-00	TUBING-HEAT SHRINK 1/8" BLACK	MP2	FT	0.1
6002-0125-00	CABLE-TIE MARKER .74" DIA	MP3	EA	1
ED-1702-21	CABLE ASSY-HOLD SWITCH, 702B	REF	EA	0

PARENT PART: 6010-1702-27		CABLE ASSY-SPEAKER, 702B (ALL)		
REF. PAGE C-11				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2101-0017-02	CON-HOUSING RECEPTACLE 2 POS .156	J1	EA	1
2101-0017-30	CON-CONTACT 18-24 AWG TIN PLATED	MP1	EA	2
6000-2000-02	WIRE-TWIST 2X24 AWG 7X32 BLACK/RED	W1	FT	0.5
ED-1702-27	CABLE ASSY-SPEAKER, 702B (ALL)	REF	EA	0

PARENT PART: 8000-1702-11		PCB ASSY-MAIN BD, 702B		
REF. PAGE C-6, C-7 TO C-10				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1500-0053-00	C-FXD MICA 3PF 1/2PF 500V	C8,11,207	EA	3
1500-0057-00	C-FXD MICA 15PF 5% 500V	C38,82	EA	2
1500-0156-00	C-FXD MICA 1000PF 5% 100V	C6	EA	1
1500-5182-00	C-FXD MICA 220PF 1% 500V	C70,73	EA	2
1500-5194-00	C-FXD MICA 680PF 1% 500V	C71,72,206	EA	3
1500-5195-00	C-FXD MICA 750PF 1% 500V	C33	EA	1
1500-5206-00	C-FXD MICA 2200PF 1% 500V	C35	EA	1
1500-5210-00	C-FXD MICA 3300PF 1% 500V	C25,26,28,29,30,31	EA	6
1501-0090-01	C-FXD CER .01UF 20% 50V .1 SP	C46-49,52,54,55,59-63,89	EA	13
1501-0090-17	C-FXD CER 2.2UF 20% 50V .2 SP	C9,10,21,22,44,45,211	EA	7
1501-0100-12	C-FXD CER DIP .1UP 50V 20% .3SP	C20,24,41,43,57,65,67,69,	EA	117
		90-109,120-205,208-210		
1502-0013-00	C-FXD MET POLY .01UF 1% 200V	C50	EA	1
1502-0015-00	C-FXD MET POLY .015UF 1% 200V	C27	EA	1
1502-0017-00	C-FXD MET POLY .022UF 1% 200V	C36,37	EA	2
1502-0019-00	C-FXD MET POLY .033UF 1% 200V	C12-47	EA	6
1502-0021-00	C-FXD MET POLY .047UF 1% 200V	C32	EA	1
1503-0041-12	C-FXD TA 1.0UF 10% 35V RADIAL	C18-39,84,85	EA	4
1502-0043-12	C-FXD TA 33UF 10% 15V RADIAL	C51,53,56	EA	3
1503-0043-18	C-FXD TA 100UF 10% 15V RADIAL	C88	EA	1
1503-0044-07	C-FXD TA 10UF 10% 20V RADIAL	C19,23,40,42,58,64,66,68,86,87	EA	10
1504-0306-00	C-FXD AL.RADIA,330UF 20% 100V	C83	EA	1
1504-0658-00	C-FXD AL 47UF -10+50% 100V RADIAL	C1-4	EA	4
1505-0008-00	C-FXD MICA 1000PF 1% 100V	C34	EA	1
1700-1702-11	PCB FAB-MAIN BD,702B	PC1	EA	1
2101-0000-01	IC-SOCKET FORMED 14 PIN .3X.1 CTRS	XU4,29	EA	2
2101-0000-02	IC-SOCKET FORMED 16 PIN .3X.1 CTRS	XU8,10,25,46	EA	4
2101-0000-04	IC-SOCKET FORMED 20 PIN .3X.1 CTRS	XU68,69,71,72,77,78	EA	6
2101-0000-06	IC-SOCKET FORMED 24 PIN .6X.1 CTRS	XU83	EA	1
2101-0000-07	IC-SOCKET FORMED 28 PIN .6X.1 CTRS	XU81,82	EA	2
2101-0000-08	IC-SOCKET FORMED 40 PIN .6X.1 CTRS	XU26,38,66	EA	3
2101-0014-42	CON-HEADER 2 PIN .156 LOCKING TIN	P9,11	EA	2
2101-0014-43	CON-HEADER 3 PIN .156 LOCKING TIN	P2	EA	1
2101-0014-45	CON-HEADER 5 PIN .156 LOCKING TIN	P3,8	EA	2
2101-0014-46	CON-HEADER 6 PIN .156 LOCKING TIN	P4	EA	1
2101-0014-48	CON-HEADER 8 PIN .156 LOCKING TIN	P1	EA	1
2101-0074-01	CON-HEADER 1 PIN ST .1 STACKABLE	TP1-13,E9-1,2	EA	15
2101-0075-40	CON-HEADER 2X20 PIN ST .1 STACKABLE	P5,10	EA	2
2101-0101-02	CON-HEADER 4 PIN .100 SP .230	P7	EA	1
2300-2018-00	OSC-CRYSTAL,TTL,19.6608 MHZ .01%	Y1	EA	1
2800-0023-00	NUT KEP 6-32X.114X1/4 CD STEEL	MP1	EA	2
2800-0632-84	SCREW-PH PHIL CD 6.32 .375LG	MP2	EA	2
2800-8098-00	TRANSISTOR-INSULATOR PAD TO-3	MP3	EA	1
3130-0006-00	IC-7406 HEX INVERTER/BUFFER	U51	EA	1
3130-1573-20	IC-74HCT573 OCTAL D LATCH 3-STATE	U70	EA	1
3130-2405-00	IC-2405 PROGRAMMABLE AMP,4 CHNL	U8,25	EA	2
3130-3235-00	IC-65681 4K X 4 CMOS SRAM,70NS	U68,69,77,78	EA	4
3130-7000-01	IC-74HC00 QUAD 2-INPUT NAND GATE	U34,64,73	EA	3
3130-7004-01	IC-74HC04 HEX INVERTER	U74,84,89,90	EA	4
3130-7010-01	IC-74HC10 TRIPLE 3-INPUT NAND GATE	U85	EA	1
3130-7074-01	IC-75HC74 DUAL D FLIP-FLOP	U58,59,62	EA	3
3130-7138-01	IC-74HC138 1-OF-8 DECODER/DEMUX	U100	EA	1
3130-7139-00	IC-74HC139 DUAL 2 TO 4 DECODER	U65	EA	1
3130-7174-01	IC-74HC174 HEX D FLIP-FLOP	U53,56,57	EA	3

3130-7244-01	IC-74HC244 OCTAL BUFF/DRVR/RCVR	U67,75,76,91,92	EA	5
3130-7245-01	IC-74HC245 OCTAL TRANSCEIVER	U80,86,87	EA	3
3130-7294-00	IC-74HC294 PRGMBL FREQ DIVIDER	U63	EA	1
3130-7312-00	IC-DAC312,12 BIT HI-SPEED DAC	U49	EA	1
3130-7393-01	IC-74HC393 DUAL 4BIT BINARY COUNTER	U35,55	EA	2
3130-7503-00	IC-7503 8-CHNL ANALOG MUX	U10,46	EA	2
3130-7512-00	IC-7512 DUAL SPDT ANALOG SWITCH	U5,13,23	EA	3
3130-7541-00	IC-7541 12-BIT MULT DAC	U48	EA	1
3130-7575-01	IC-74HC574 OCTAL D FLIP FLOP	U27,32,52,54,60,61,79,88,93-99	EA	15
3130-7584-00	IC-AD584 PRGRMBL PRECISION VLTG REF	U28	EA	1
3130-7923-00	IC-74C923 20 KEY ENCODER	U37	EA	1
3131-0008-00	IC-TL082 DUAL JFET OP AMP	U3,6,7,9,11,12,14-21,24,30,	EA	20
		41, 44, 45, 47		
3131-0108-00	IC-7812 REGULATOR +12V TO -220	VR2	EA	1
3131-0109-03	IC-7912 REGULATOR -12V TO -220	VR3	EA	1
3131-0317-02	IC-LM217HVK.ADJ HI-VLTG REG, TO-3	VR1	EA	1
3131-0386-00	IC-LM386 AUDIO AMPLIFIER	U101	EA	1
3131-0393-00	IC-LM393 VOLTAGE COMPARATOR	U1,2,31	EA	3
3132-1488-00	IC-1488 QUAD LINE DRIVER	U33	EA	1
3132-1489-00	IC-1489 QUAD LINE RECEIVER	U36	EA	1
4000-0037-00	PWR SPLY-48V IN +5VDC,±15VDC OUT	PS1	EA	1
4500-0057-00	RELAY-5VDC,4C,2 AMP,125 OHM PC MT	K2	EA	1
4500-0058-00	RELAY-PCM,1C,5VDC,SNGL SIDE STABLE	K3-5	EA	3
4703-0001-00	R-FXD MF 10.0 OHM 1% 1/4W	R2,80,95	EA	3
4703-0069-00	R-FXD MF 51.1 OHM 1% 1/4W	R1	EA	1
4703-0093-00	R-FXD MF 90.0 OHM 1% 1/4W	R29,81	EA	2
4703-0097-00	R-FXD MF 100 OHM 1% 1/4W	R117	EA	1
4703-0107-00	R-FXD MF 127 OHM 1% 1/4W	R19	EA	1
4703-0126-00	R-FXD MF 200 OHM 1% 1/4W	R20,114	EA	2
4703-0143-00	R-FXD MF 301 OHM 1% 1/4W	R6	EA	1
4703-0162-00	R-FXD MF 475 OHM 1% 1/4W	R21	EA	1
4703-0164-00	R-FXD MF 499 OHM 1% 1/4W	R26	EA	1
4703-0172-00	R-FXD MF 604 OHM 1% 1/4W	R7	EA	1
4703-0181-00	R-FXD MF 750 OHM 1% 1/4W	R96	EA	1
4703-0189-00	R-FXD MF 909 OHM 1% 1/4W	R28,79,116	EA	3
4703-0193-00	R-FXD MF 1.00K OHM 1% 1/4W	R77	EA	1
4703-0202-00	R-FXD MF 1.24K OHM 1% 1/4W	R101	EA	1
4703-0207-00	R-FXD MF 1.40K OHM 1% 1/4W	R59,91	EA	2
4703-0231-00	R-FXD MF 2.49K OHM 1% 1/4W	R99,100	EA	2
4703-0240-00	R-FXD MF 3.09K OHM 1% 1/4W	R72	EA	1
4703-0249-00	R-FXD MF 3.83K OHM 1% 1/4W	R70	EA	1
4703-0258-00	R-FXD MF 4.75K OHM 1% 1/4W	R30,36,40,45,54,55	EA	7
4703-0259-00	R-FXD MF 4.87K OHM 1% 1/4W	R50,53	EA	2
4703-0260-00	R-FXD MF 4.99K OHM 1% 1/4W	R23-25	EA	3
4703-0267-00	R-FXD MF 5.90K OHM 1% 1/4W	R63,67	EA	2
4703-0268-00	R-FXD MF 6.04K OHM 1% 1/4W	R102	EA	1
4703-0279-00	R-FXD MF 7.87K OHM 1% 1/4W	R104	EA	1
4703-0285-00	R-FXD MF 9.09K OHM 1% 1/4W	R9,11,27,78,115	EA	5
4703-0289-00	R-FXD MF 10.0K OHM 1% 1/4W	R34,68,86,88,93,94,97,98	EA	8
4703-0292-00	R-FXD MF 10.7K OHM 1% 1/4W	R35	EA	1
4703-0301-00	R-FXD MF 13.3K OHM 1% 1/4W	R105	EA	1
4703-0306-00	R-FXD MF 15.0K OHM 1% 1/4W	R84	EA	1
4703-0308-00	R-FXD MF 15.8K OHM 1% 1/4W	R71	EA	1
4703-0310-00	R-FXD MF 16.5K OHM 1% 1/4W	R58,90	EA	2
4703-0318-00	R-FXD MF 20.0K OHM 1% 1/4W	R32,33,37-39,41,43,46,47,51,52	EA	11
4703-0321-00	R-FXD MF 21.5K OHM 1% 1/4W	R44,49	EA	2
4703-0323-00	R-FXD MF 22.6K OHM 1% 1/4W	R57,89	EA	2
4703-0324-00	R-FXD MF 23.2K OHM 1% 1/4W	R75	EA	1

4703-0326-00	R-FXD MF 24.3K OHM 1% 1/4W	R56,83,103	EA	3
4703-0330-00	R-FXD MF 26.7K OHM 1% 1/4W	R74	EA	1
4703-0347-00	R-FXD MF 40.2K OHM 1% 1/4W	R42	EA	1
4703-0351-00	R-FXD MF 44.2K OHM 1% 1/4W	R48,60	EA	2
4703-0354-00	R-FXD MF 47.5K OHM 1% 1/4W	R22,31	EA	2
4703-0355-00	R-FXD MF 48.7K OHM 1% 1/4W	R73	EA	1
4703-0360-00	R-FXD MF 54.9K OHM 1% 1/4W	R76	EA	1
4703-0362-00	R-FXD MF 57.6K OHM 1% 1/4W	R61	EA	1
4703-0371-00	R-FXD MF 71.5K OHM 1% 1/4W	R69	EA	1
4703-0380-00	R-FXD MF 88.7K OHM 1% 1/4W	R62	EA	1
4703-0381-00	R-FXD MF 90.0K OHM 1% 1/4W	R8,10	EA	2
4703-0400-00	R-FXD MF 143K OHM 1% 1/4W	R66	EA	1
4703-0417-00	R-FXD MF 215K OHM 1% 1/4W	R64	EA	1
4703-0423-00	R-FXD MF 249K OHM 1% 1/4W	R65	EA	1
4703-0501-00	R-FXD MF 1.62M OHM 1% 1/4W	R92	EA	1
4710-0019-45	R-PAK 10 PIN 9 RES 4.7K OHM 2%	RP1	EA	1
4710-0019-50	R-PAK 10 PIN 9 RES 10K OHM 2%	RP2	EA	1
4750-0051-06	R-VAR PC MULTITRN 1K OHM 1/2W 10%	R87	EA	1
4750-0051-08	R-VAR PC MULTITRN 5K OHM 1/2W 10%	R85	EA	1
4790-0002-00	VOLTAGE SUPPRESSOR-500W,44-49V PROT	V4	EA	1
4790-0320-00	VARISTOR-320V AC RMS .55" DIA	V1-3	EA	3
4802-0825-00	DIODE-1N825A 6.2 V ZENER REFERENCE	CR27	EA	1
4802-4002-00	DIODE-1N4002 1A 100V	CR24-26,28,29	EA	5
4802-4003-00	DIODE-1N4003 1A 200V	CR4,5,16,17	EA	4
4802-4148-00	DIODE-1N4148 200 MA 75 V	CR2,3,6-14,18-22	EA	16
4802-5818-00	DIODE-1N5818 1 A 30 V SCHOTTKY	CR23	EA	1
4803-0050-04	DIODE-BRIDGE 1A 400V 4 PIN DIP	BR1	EA	1
5600-0004-02	TRANSFORMER-HIGH FREQUENCY 110KHZ	T1	EA	1
5600-0005-02	TRANSFORMER-HIGH FREQUENCY 110KHZ	T2	EA	1
5600-0038-00	XFMR-PWR 110/220V/DUAL 24 VCT @ .5A	T3	EA	1
ED-1702-11	PCB ASSY-MAIN BD,702B	REF	EA	0
SD-1702-11	SCHEM-MAIN BD,702B	REF	EA	0

PARENT PART: 8000-1702-12		PCB ASSY-MAIN BD, 702B (48VDC)		
REF. PAGE C-6, C-7 TO C-10				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1500-0053-00	C-FXD MICA 3PF 1/2PF 500V	C8,11,207	EA	3
1500-0057-00	C-FXD MICA 15PF 5% 500V	C38,82	EA	2
1500-0156-00	C-FXD MICA 1000PF 5% 100V	C6	EA	1
1500-5182-00	C-FXD MICA 220PF 1% 500V	C70,73	EA	2
1500-5194-00	C-FXD MICA 680PF 1% 500V	C71,72,206	EA	3
1500-5195-00	C-FXD MICA 750PF 1% 500V	C33	EA	1
1500-5206-00	C-FXD MICA 2200PF 1% 500V	C35	EA	1
1500-5210-00	C-FXD MICA 3300PF 1% 500V	C25,26,28,29,30,31	EA	6
1501-0090-01	C-FXD CER .01UF 20% 50V .1 SP	C46-49,52,54,55,59-63,89	EA	13
1501-0090-17	C-FXD CER 2.2UF 20% 50V .2 SP	C9,10,21,22,44,45,211	EA	7
1501-0100-12	C-FXD CER DIP .1UP 50V 20% .3SP	C20,24,41,43,57,65,67,69,	EA	117
		90-109,120-205,208-210		
1502-0013-00	C-FXD MET POLY .01UF 1% 200V	C50	EA	1
1502-0015-00	C-FXD MET POLY .015UF 1% 200V	C27	EA	1
1502-0017-00	C-FXD MET POLY .022UF 1% 200V	C36,37	EA	2
1502-0019-00	C-FXD MET POLY .033UF 1% 200V	C12-47	EA	6
1502-0021-00	C-FXD MET POLY .047UF 1% 200V	C32	EA	1
1503-0041-12	C-FXD TA 1.0UF 10% 35V RADIAL	C18-39,84,85	EA	4
1502-0043-12	C-FXD TA 33UF 10% 15V RADIAL	C51,53,56	EA	3
1503-0043-18	C-FXD TA 100UF 10% 15V RADIAL	C88	EA	1
1503-0044-07	C-FXD TA 10UF 10% 20V RADIAL	C19,23,40,42,58,64,66,68,86,87	EA	10
1504-0306-00	C-FXD AL.RADIA,330UF 20% 100V	C83	EA	1
1504-0658-00	C-FXD AL 47UF -10+50% 100V RADIAL	C1-4	EA	4
1505-0008-00	C-FXD MICA 1000PF 1% 100V	C34	EA	1
1700-1702-11	PCB FAB-MAIN BD,702B	PC1	EA	1
2101-0000-01	IC-SOCKET FORMED 14 PIN .3X.1 CTRS	XU4,29	EA	2
2101-0000-02	IC-SOCKET FORMED 16 PIN .3X.1 CTRS	XU8,10,25,46	EA	4
2101-0000-04	IC-SOCKET FORMED 20 PIN .3X.1 CTRS	XU68,69,71,72,77,78	EA	6
2101-0000-06	IC-SOCKET FORMED 24 PIN .6X.1 CTRS	XU83	EA	1
2101-0000-07	IC-SOCKET FORMED 28 PIN .6X.1 CTRS	XU81,82	EA	2
2101-0000-08	IC-SOCKET FORMED 40 PIN .6X.1 CTRS	XU26,38,66	EA	3
2101-0014-42	CON-HEADER 2 PIN .156 LOCKING TIN	P9,11	EA	2
2101-0014-43	CON-HEADER 3 PIN .156 LOCKING TIN	P2	EA	1
2101-0014-45	CON-HEADER 5 PIN .156 LOCKING TIN	P3,8	EA	2
2101-0014-46	CON-HEADER 6 PIN .156 LOCKING TIN	P4	EA	1
2101-0014-48	CON-HEADER 8 PIN .156 LOCKING TIN	P1	EA	1
2101-0074-01	CON-HEADER 1 PIN ST .1 STACKABLE	TP1-13,E9-1,2	EA	15
2101-0075-40	CON-HEADER 2X20 PIN ST .1 STACKABLE	P5,10	EA	2
2101-0101-02	CON-HEADER 4 PIN .100 SP .230	P7	EA	1
2300-2018-00	OSC-CRYSTAL,TTL,19.6608 MHZ .01%	Y1	EA	1
2800-0023-00	NUT KEP 6-32X.114X1/4 CD STEEL	MP1	EA	2
2800-0632-84	SCREW-PH PHIL CD 6.32 .375LG	MP2	EA	2
2800-8098-00	TRANSISTOR-INSULATOR PAD TO-3	MP3	EA	1
3130-0006-00	IC-7406 HEX INVERTER/BUFFER	U51	EA	1
3130-1573-20	IC-74HCT573 OCTAL D LATCH 3-STATE	U70	EA	1
3130-2405-00	IC-2405 PROGRAMMABLE AMP,4 CHNL	U8,25	EA	2
3130-3235-00	IC-65681 4K X 4 CMOS SRAM,70NS	U68,69,77,78	EA	4
3130-7000-01	IC-74HC00 QUAD 2-INPUT NAND GATE	U34,64,73	EA	3
3130-7004-01	IC-74HC04 HEX INVERTER	U74,84,89,90	EA	4
3130-7010-01	IC-74HC10 TRIPLE 3-INPUT NAND GATE	U85	EA	1
3130-7074-01	IC-75HC74 DUAL D FLIP-FLOP	U58,59,62	EA	3
3130-7138-01	IC-74HC138 1-OF-8 DECODER/DEMUX	U100	EA	1
3130-7139-00	IC-74HC139 DUAL 2 TO 4 DECODER	U65	EA	1
3130-7174-01	IC-74HC174 HEX D FLIP-FLOP	U53,56,57	EA	3

3130-7244-01	IC-74HC244 OCTAL BUFF/DRVR/RCVR	U67,75,76,91,92	EA	5
3130-7245-01	IC-74HC245 OCTAL TRANSCEIVER	U80,86,87	EA	3
3130-7294-00	IC-74HC294 PRGMBL FREQ DIVIDER	U63	EA	1
3130-7312-00	IC-DAC312,12 BIT HI-SPEED DAC	U49	EA	1
3130-7393-01	IC-74HC393 DUAL 4BIT BINARY COUNTER	U35,55	EA	2
3130-7503-00	IC-7503 8-CHNL ANALOG MUX	U10,46	EA	2
3130-7512-00	IC-7512 DUAL SPDT ANALOG SWITCH	U5,13,23	EA	3
3130-7541-00	IC-7541 12-BIT MULT DAC	U48	EA	1
3130-7575-01	IC-74HC574 OCTAL D FLIP FLOP	U27,32,52,54,60,61,79,88,93-99	EA	15
3130-7584-00	IC-AD584 PRGRMBL PRECISION VLTG REF	U28	EA	1
3130-7923-00	IC-74C923 20 KEY ENCODER	U37	EA	1
3131-0008-00	IC-TL082 DUAL JFET OP AMP	U3,6,7,9,11,12,14-21	EA	20
		24, 30, 41, 44, 45, 47		
3131-0108-00	IC-7812 REGULATOR +12V TO -220	VR2	EA	1
3131-0109-03	IC-7912 REGULATOR -12V TO -220	VR3	EA	1
3131-0317-02	IC-LM217HVK.ADJ HI-VLTG REG, TO-3	VR1	EA	1
3131-0386-00	IC-LM386 AUDIO AMPLIFIER	U101	EA	1
3131-0393-00	IC-LM393 VOLTAGE COMPARATOR	U1,2,31	EA	3
3132-1488-00	IC-1488 QUAD LINE DRIVER	U33	EA	1
3132-1489-00	IC-1489 QUAD LINE RECEIVER	U36	EA	1
4000-0037-00	PWR SPLY-48V IN +5VDC,±15VDC OUT	PS1	EA	1
4500-0057-00	RELAY-5VDC,4C,2 AMP,125 OHM PC MT	K2	EA	1
4500-0058-00	RELAY-PCM,1C,5VDC,SNGL SIDE STABLE	K3-5	EA	3
4703-0001-00	R-FXD MF 10.0 OHM 1% 1/4W	R2,80,95	EA	3
4703-0069-00	R-FXD MF 51.1 OHM 1% 1/4W	R1	EA	1
4703-0093-00	R-FXD MF 90.0 OHM 1% 1/4W	R29,81	EA	2
4703-0097-00	R-FXD MF 100 OHM 1% 1/4W	R117	EA	1
4703-0107-00	R-FXD MF 127 OHM 1% 1/4W	R19	EA	1
4703-0126-00	R-FXD MF 200 OHM 1% 1/4W	R20,114	EA	2
4703-0143-00	R-FXD MF 301 OHM 1% 1/4W	R6	EA	1
4703-0162-00	R-FXD MF 475 OHM 1% 1/4W	R21	EA	1
4703-0164-00	R-FXD MF 499 OHM 1% 1/4W	R26	EA	1
4703-0172-00	R-FXD MF 604 OHM 1% 1/4W	R7	EA	1
4703-0181-00	R-FXD MF 750 OHM 1% 1/4W	R96	EA	1
4703-0189-00	R-FXD MF 909 OHM 1% 1/4W	R28,79,116	EA	3
4703-0193-00	R-FXD MF 1.00K OHM 1% 1/4W	R77	EA	1
4703-0202-00	R-FXD MF 1.24K OHM 1% 1/4W	R101	EA	1
4703-0207-00	R-FXD MF 1.40K OHM 1% 1/4W	R59,91	EA	2
4703-0231-00	R-FXD MF 2.49K OHM 1% 1/4W	R99,100	EA	2
4703-0240-00	R-FXD MF 3.09K OHM 1% 1/4W	R72	EA	1
4703-0249-00	R-FXD MF 3.83K OHM 1% 1/4W	R70	EA	1
4703-0258-00	R-FXD MF 4.75K OHM 1% 1/4W	R30,36,40,45,54,55	EA	7
4703-0259-00	R-FXD MF 4.87K OHM 1% 1/4W	R50,53	EA	2
4703-0260-00	R-FXD MF 4.99K OHM 1% 1/4W	R23-25	EA	3
4703-0267-00	R-FXD MF 5.90K OHM 1% 1/4W	R63,67	EA	2
4703-0268-00	R-FXD MF 6.04K OHM 1% 1/4W	R102	EA	1
4703-0279-00	R-FXD MF 7.87K OHM 1% 1/4W	R104	EA	1
4703-0285-00	R-FXD MF 9.09K OHM 1% 1/4W	R9,11,27,78,115	EA	5
4703-0289-00	R-FXD MF 10.0K OHM 1% 1/4W	R34,68,86,88,93,94,97,98	EA	8
4703-0292-00	R-FXD MF 10.7K OHM 1% 1/4W	R35	EA	1
4703-0301-00	R-FXD MF 13.3K OHM 1% 1/4W	R105	EA	1
4703-0306-00	R-FXD MF 15.0K OHM 1% 1/4W	R84	EA	1
4703-0308-00	R-FXD MF 15.8K OHM 1% 1/4W	R71	EA	1
4703-0310-00	R-FXD MF 16.5K OHM 1% 1/4W	R58,90	EA	2
4703-0318-00	R-FXD MF 20.0K OHM 1% 1/4W	R32,33,37-39,41,43,46,47,51,52	EA	11
4703-0321-00	R-FXD MF 21.5K OHM 1% 1/4W	R44,49	EA	2
4703-0323-00	R-FXD MF 22.6K OHM 1% 1/4W	R57,89	EA	2
4703-0324-00	R-FXD MF 23.2K OHM 1% 1/4W	R75	EA	1

4703-0326-00	R-FXD MF 24.3K OHM 1% 1/4W	R56,83,103	EA	3
4703-0330-00	R-FXD MF 26.7K OHM 1% 1/4W	R74	EA	1
4703-0347-00	R-FXD MF 40.2K OHM 1% 1/4W	R42	EA	1
4703-0351-00	R-FXD MF 44.2K OHM 1% 1/4W	R48,60	EA	2
4703-0354-00	R-FXD MF 47.5K OHM 1% 1/4W	R22,31	EA	2
4703-0355-00	R-FXD MF 48.7K OHM 1% 1/4W	R73	EA	1
4703-0360-00	R-FXD MF 54.9K OHM 1% 1/4W	R76	EA	1
4703-0362-00	R-FXD MF 57.6K OHM 1% 1/4W	R61	EA	1
4703-0371-00	R-FXD MF 71.5K OHM 1% 1/4W	R69	EA	1
4703-0380-00	R-FXD MF 88.7K OHM 1% 1/4W	R62	EA	1
4703-0381-00	R-FXD MF 90.0K OHM 1% 1/4W	R8,10	EA	2
4703-0400-00	R-FXD MF 143K OHM 1% 1/4W	R66	EA	1
4703-0417-00	R-FXD MF 215K OHM 1% 1/4W	R64	EA	1
4703-0423-00	R-FXD MF 249K OHM 1% 1/4W	R65	EA	1
4703-0501-00	R-FXD MF 1.62M OHM 1% 1/4W	R92	EA	1
4710-0019-45	R-PAK 10 PIN 9 RES 4.7K OHM 2%	RP1	EA	1
4710-0019-50	R-PAK 10 PIN 9 RES 10K OHM 2%	RP2	EA	1
4750-0051-06	R-VAR PC MULTITRN 1K OHM 1/2W 10%	R87	EA	1
4750-0051-08	R-VAR PC MULTITRN 5K OHM 1/2W 10%	R85	EA	1
4790-0002-00	VOLTAGE SUPPRESSOR-500W,44-49V PROT	V4	EA	1
4790-0320-00	VARISTOR-320V AC RMS .55" DIA	V1-3	EA	3
4802-0825-00	DIODE-1N825A 6.2 V ZENER REFERENCE	CR27	EA	1
4802-4002-00	DIODE-1N4002 1A 100V	CR24-26,28,29	EA	5
4802-4003-00	DIODE-1N4003 1A 200V	CR4,5,16,17	EA	4
4802-4148-00	DIODE-1N4148 200 MA 75 V	CR2,3,6-14,18-22	EA	16
4802-5818-00	DIODE-1N5818 1 A 30 V SCHOTTKY	CR23	EA	1
4803-0050-04	DIODE-BRIDGE 1A 400V 4 PIN DIP	BR1	EA	1
5600-0004-02	TRANSFORMER-HIGH FREQUENCY 110KHZ	T1	EA	1
5600-0005-02	TRANSFORMER-HIGH FREQUENCY 110KHZ	T2	EA	1
5600-0038-00	XFMR-PWR 110/220V/DUAL 24 VCT @ .5A	T3	EA	1
ED-1702-11	PCB ASSY-MAIN BD,702B	REF	EA	0
SD-1702-11	SCHEM-MAIN BD,702B	REF	EA	0

PARENT PART:	8001-1702-13	PCB ASSY-FRONT PANEL BD, 702B		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
8000-1702-13	PCB ASSY-FRONT PANEL BD, 702B		EA	1
TP-1702-13	TEST PROC-FRONT PANEL BD, 702B	REF	EA	0

PARENT PART: 8000-1702-13		PCB ASSY-FRONT PANEL BD, 702B		
REF. PAGE C-19, C-20 TO C-21				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1501-0100-12	C-FXD CER DIP .1UF 50V 20% .3SP	C5,8,11,12		
1503-0044-07	C-FXD TA 10UF 10% 20V RADIAL	C9		
1700-1702-13	PCB FAB-FRONT PANEL BD,702B	PC1		
2101-0075-10	CON-HEADER 2X20 PIN ST .1 STACKABLE	P1,10		
2400-0002-01	LED-T1 RED 1.8V.2MA	DS10-29		
2400-0058-01	DISPLAY-± RED,2MA,COMMON CATHODE	DS1		
2400-0063-00	DISPLAY-7 SEG,RED,2MA,RH DECIMAL,CC	DS2-6,8,9		
3130-0048-01	IC-74C48 BCD TO 7 SEG DECODER, CMOS	U1-7		
4710-0019-33	R-PAK 10 PIN 9 RES 1.0K OHM 2%	RP12-14		
4710-0020-33	R-PAK 10 PIN 5 RES 1.0K OHM 2%	RP1-11		
5100-0700-00	SW-KEYPAD,SPST-NO,PC MT,DK GREY	S1-12		

PARENT PART: 8001-0702-24		TSTD PDB ASSY-MAIN BD,702 (230V)		
REF. PAGE C-5				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
3130-2064-00	IC-2064 8K X 8 STATIC RAM 150NS	U82	EA	1
3130-6303-02	IC-63B03 8-BIT CMOS MPU	U38	EA	1
3130-7320-00	IC-320C10,DIG SIGNAL PRCSSR,20MHZ	U66	EA	1
3130-7536-00	IC-AD536AK RMS/DC CONV TO-116	U29	EA	1
3130-7536-01	IC-AD536AJ RSM/DC CONV,TO116	U4	EA	1
3130-7552-00	IC-AD7552 12-BIT, + SIGN A/D CONV	U26	EA	1
3135-2816-26	IC-28C16 2KX8 BIT EEPROM,250NS	U83	EA	1
6000-0700-09	WIRE-KYNAR 26 AWG SOLID WHITE		FT	0.1
8000-1702-11	PCB ASSY-MAIN BD, 702B		EA	1
ED-0702-24	TSTD PCB ASSY-MAIN BD,702 (230V)	REF	EA	0
ED-1702-11	PCB ASSY-MAIN BD, 702B	REF	EA	0
SD-1702-11	SCHEM-MAIN BD, 702B	REF	EA	0
TP-1702-11	TEST PROC-MAIN BD,702B (ALL)	REF	EA	0

PARENT PART: 8001-1702-11		TSTD PDB ASSY-MAIN BD,702 (115/230)		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
3130-2064-00	IC-2064 8K X 8 STATIC RAM 150NS	U82	EA	1
3130-6303-02	IC-63B03 8-BIT CMOS MPU	U38	EA	1
3130-7320-00	IC-320C10,DIG SIGNAL PRCSSR,20MHZ	U66	EA	1
3130-7536-00	IC-AD536AK RMS/DC CONV TO-116	U29	EA	1
3130-7536-01	IC-AD536AJ RMS/DC CONV,TO116	U4	EA	1
3130-7552-00	IC-AD7552 12-BIT, + SIGN A/D CONF	U26	EA	1
3135-2816-26	IC-28C16 2KX8 BIT EEPROM,250NS	U83	EA	1
8000-1702-11	PCB ASSY-MAIN BD,702B		EA	1
ED-1702-11	PCB ASSY-MAIN BD,702B	REF	EA	0
SD-1702-11	SCHEM-MAIN BD,702B	REF	EA	0
TP-1702-11	TEST PROC-MAIN BD,702B (ALL)	REF	EA	0

PARENT PART: 8001-1702-12		TSTD PDB ASSY-MAIN BD,702 (48VDC)		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
3130-2064-00	IC-2064 8K X 8 STATIC RAM 150NS	U82	EA	1
3130-6303-02	IC-63B03 8-BIT CMOS MPU	U38	EA	1
3130-7320-00	IC-320C10,DIG SIGNAL PRCSSR,20MHZ	U66	EA	1
3130-7536-00	IC-AD536AK RMS/DC CONV TO-116	U29	EA	1
3130-7536-01	IC-AD536AJ RMS/DC CONV,TO116	U4	EA	1
3130-7552-00	IC-AD7552 12-BIT, + SIGN A/D CONF	U26	EA	1
3135-2816-26	IC-28C16 2KX8 BIT EEPROM,250NS	U83	EA	1
8000-1702-11	PCB ASSY-MAIN BD,702B		EA	1
ED-1702-11	PCB ASSY-MAIN BD,702B	REF	EA	0
SD-1702-11	SCHEM-MAIN BD,702B	REF	EA	0
TP-1702-11	TEST PROC-MAIN BD,702B (ALL)	REF	EA	0

PARENT PART: 8210-0702-20		FRONT PANEL ASSY-702		
REF. PAGE C-14				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2100-0025-00	BINDING-POST 15A SOLDER TERM. RED	J1,2	EA	2
2100-0028-00	BINDING-POST 15A SOLDER TERM. GREEN	J3,4	EA	2
2401-0052-00	KNOB-ROUND .37" DIA 1/8" SHAFT LINE	MP8	EA	1
2500-0702-21	FRONT PANEL-702	MP1	EA	1
2500-1703-25	WINDOW TRANSPARENT RED, 702B	MP2	EA	2
2800-0013-00	NUT-HEX 6-32X.25 STEEL	MP7	EA	1
2800-0023-00	NUT-HEX 6-32X.114X1/4 CD STEEL	MP6	EA	5
2800-0076-01	WASHER-EXT. TOOTH SS #6 .317 OD	MP5	EA	2
2800-1065-00	WASHER-FLAT NT #6 .312 OD .047 T	MP4	EA	5
2800-7600-31	SPACER-RD,NT,#,1/4 DIA,.312 LG	MP3	EA	5
6010-1702-19	CABLE ASSY VOLUME CONTROL, 702B	CA1	EA	1
6010-1702-20	CABLE ASSY-CHASSIS GND,702B	CA3	EA	1
6010-1702-21	CABLE ASSY-HOLD SWITCH, 702B	CA2	EA	1
8001-1702-13	TSTD PCB ASSY-FRNT PNL BD,702B	A1	EA	1
ED-0702-20	FRONT PANEL ASSY-702	REF	EA	0

PARENT PART: 8850-0702-20		PROCESS ASSY-702 (ALL)		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1300-0001-03	SPEAKER-8 OHM, 50MM X 4MM THK	LS1	EA	1
2103-0014-56	TERM BLOCK-6 POS,3/8SSP,PNL MT,Q/C	TB1	EA	1
2500-0100-20	CHASSIS-UNIV,RACK MT,1.75	MP2	EA	1
2500-0100-21	COVER-UNIV,RACK MT,1.75	MP3	EA	1
2500-0702-22	REAR PANEL-702	MP4	EA	1
2500-1702-26	BRACKET-RACK MNT (19") ,702B	MP5	EA	2
2800-0022-00	NUT-KEP 4-40X.098 STEEL	MP6	EA	2
2800-0280-03	SCREW-PH PHIL BO 6.32 .375 LG	MP7	EA	4
2800-0403-02	SCREW-FH 100DEG PHIL BO 6-32 .250LG	MP8	EA	8
2800-0832-02	SCREW-FH 82DEG PHIL SS 8-32 .375LG	MP9	EA	4
2800-0832-56	SCREW-PH PHIL SS 8-32 .250LG	MP10	EA	6
6010-1702-14	CABLE ASSY-TRANSMIT,702B	CA1	EA	1
6010-1702-15	CABLE ASSY-RECEIVE/HOLD ,702B	CA2	EA	1
6010-1702-18	CABLE ASSY-FRONT PANEL I/F,702B	CA3,4	EA	2
6010-1702-20	CABLE ASSY-CHASSIS GND,702B	CA5	EA	1
6010-1702-27	CABLE ASSY-SPEAKER, 702B (ALL)	CA7	EA	1
7000-7702-01	SOFTWARE DEVICE BOM-702B		EA	1
8510-0702-20	FRONT PANEL ASSY-702	A1	EA	1
J-0702-20	FNL ASSY-702 XMSN TEST SET,115/230V	REF	EA	0
J-0702-23	FNL ASSY-702 XMSN TEST SET,48VDC	REF	EA	0

PARENT PART: 9000-0702-20		PROCESS ASSY-702 (ALL)		
REF. PAGE C-1 TO C-2				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2450-0020-22	LABEL-SERIAL NO. (CXR TELCOM)702	MP11	EA	1
2450-0044-00	LABEL-PWR. MOD. 115VAC USE ONLY	MP19	EA	1
2800-0023-00	NUT-KEP 6-32X.114X1/4 CD STEEL	MP20	EA	3
2800-0073-00	WASHER-INT. TOOTH CD #6 .290 OD	MP12	EA	11
2800-0632-82	SCREW-PH PHIL CD 6.32 .250LG	MP14	EA	8
2800-0632-83	SCREW-PH PHIL CD 6.32 .312LG	MP15	EA	3
2800-1064-00	WASHER-FLAT NY #6 .250 OD .063T	MP13	EA	14
2800-7280-03	STANDOFF-HEX NI 1/4 M/F 6-32 .500LG	MP16	EA	3
5101-0032-00	FUSE-CART 500MA 250V SLOW BLOW	F1	EA	1
6002-0100-01	CABLE-CLAMP FOR .25" DIA CABLE	MP17	EA	2
6002-0100-03	CABLE-CLAMP FOR .5" DIA CABLE	MP18 .	EA	1
6010-1702-16	CABLE ASSY-AC POWER, 702B	CA6	EA	1
8001-1702-11	TSTD PDB ASSY-MAIN BD,702B (115/230)	A2	EA	1
8850-0702-20	PROCESS ASSY-702 (ALL)		EA	1
AT-0702-20	ACCEPTANCE TEST PROCEDURE-702,(ALL)	REF	EA	0
J-0702-20	FNL ASSY-702 XMSN TEST SET,115/230V	REF	EA	0
PFC-0702-20	PRODUCTION FLOW CHART-702	REF	EA	0
PT-0702-20	PRODUCT TREE-702	REF	EA	0

PARENT PART: 9000-0702-23		FNL ASSY-702 XMSN TEST SET,48VDC		
REF. PAGE C-1 TO C-2				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PE
2450-0020-22	LABEL-SERIAL NO. (CXR TELCOM)702	MP11	EA	1
2450-0044-00	LABEL-PWR. MOD. 115VAC USE ONLY	MP19	EA	1
2800-0023-00	NUT-KEP 6-32X.114X1/4 CD STEEL	MP20	EA	3
2800-0073-00	WASHER-INT. TOOTH CD #6 .290 OD	MP12	EA	11
2800-0632-82	SCREW-PH PHIL CD 6.32 .250LG	MP14	EA	8
2800-0632-83	SCREW-PH PHIL CD 6.32 .312LG	MP15	EA	3
2800-1064-00	WASHER-FLAT NY #6 .250 OD .063T	MP13	EA	14
2800-7280-03	STANDOFF-HEX NI 1/4 M/F 6-32 .500LG	MP16	EA	3
5101-0032-00	FUSE-CART 500MA 250V SLOW BLOW	F1	EA	1
6002-0100-01	CABLE-CLAMP FOR .25" DIA CABLE	MP17	EA	2
6002-0100-03	CABLE-CLAMP FOR .5" DIA CABLE	MP18	EA	1
6010-1702-16	CABLE ASSY-AC POWER, 702B	CA6	EA	1
8001-1702-11	TSTD PDB ASSY-MAIN BD,702B (115/230)	A2	EA	1
8850-0702-20	PROCESS ASSY-702 (ALL)		EA	1
AT-0702-20	ACCEPTANCE TEST PROCEDURE-702,(ALL)	REF	EA	0
J-0702-20	FNL ASSY-702 XMSN TEST SET,115/230V	REF	EA	0
PFC-0702-20	PRODUCTION FLOW CHART-702	REF	EA	0
PT-0702-20	PRODUCT TREE-702	REF	EA	0

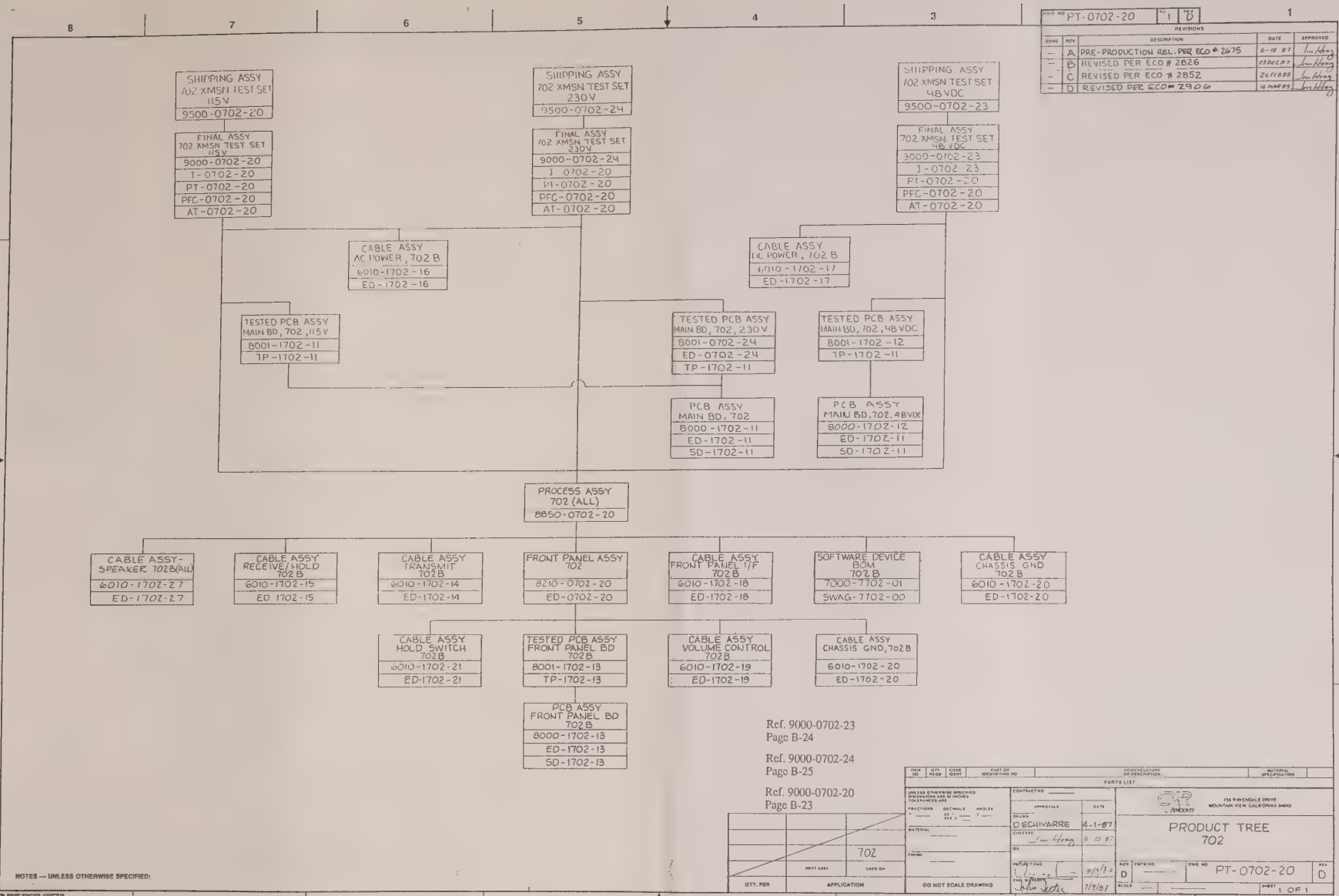
PARENT PART: 9000-0702-24		FNL ASSY-702 XMSN TEST SET ,230V		
REF. PAGE C-1 TO C-2				
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
2450-0020-22	LABEL-SERIAL NO. (CXR TELCOM)702	MP11	EA	1
2450-0044-00	LABEL-PWR. MOD. 115VAC USE ONLY	MP19	EA	1
2800-0023-00	NUT-KEP 6-32X.114X1/4 CD STEEL	MP20	EA	3
2800-0073-00	WASHER-INT. TOOTH CD #6 .290 OD	MP12	EA	11
2800-0632-82	SCREW-PH PHIL CD 6.32 .250LG	MP14	EA	8
2800-0632-83	SCREW-PH PHIL CD 6.32 .312LG	MP15	EA	3
2800-1064-00	WASHER-FLAT NY #6 .250 OD .063T	MP13	EA	14
2800-7280-03	STANDOFF-HEX NI 1/4 M/F 6-32 .500LG	MP16	EA	3
5101-0032-00	FUSE-CART 500MA 250V SLOW BLOW	F1	EA	1
6002-0100-01	CABLE-CLAMP FOR .25" DIA CABLE	MP17	EA	2
6002-0100-03	CABLE-CLAMP FOR .5" DIA CABLE	MP18	EA	1
6010-1702-16	CABLE ASSY-AC POWER, 702B	CA6	EA	1
8001-1702-11	TSTD PDB ASSY-MAIN BD,702B (115/230)	A2	EA	1
8850-0702-20	PROCESS ASSY-702 (ALL)		EA	1
AT-0702-20	ACCEPTANCE TEST PROCEDURE-702,(ALL)	REF	EA	0
J-0702-20	FNL ASSY-702 XMSN TEST SET,115/230V	REF	EA	0
PFC-0702-20	PRODUCTION FLOW CHART-702	REF	EA	0
PT-0702-20	PRODUCT TREE-702	REF	EA	0

PARENT PART: 9500-0702-20		SHP ASSY-702 XMSN TEST SET,115V		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1402-0029-00	CARTON-SHIPPING, 11A/156R/702B		EA	1
1402-0029-01	FOAM INSERT, 110A/156R/702B		EA	2
4200-0702-20	OP MANUAL-702 (ALL)		EA	1
6001-0503-00	CORD-POWER 8' MALE/FEMALE PLUGS		EA	1
9000-0702-20	FNL ASSY-702 XMSN TEST SET, 115V		EA	1

PARENT PART: 9500-0702-23		SHP ASSY-702 XMSN TEST SET,48VDC		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1402-0029-00	CARTON-SHIPPING, 11A/156R/702B		EA	1
1402-0029-01	FOAM INSERT, 110A/156R/702B		EA	2
4200-0702-20	OP MANUAL-702 (ALL)		EA	1
9000-0702-20	FNL ASSY-702 XMSN TEST SET, 115V		EA	1

PARENT PART: 9500-0702-24		SHP ASSY-702 XMSN TEST SET,230V		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
1402-0029-00	CARTON-SHIPPING, 11A/156R/702B		EA	1
1402-0029-01	FOAM INSERT, 110A/156R/702B		EA	2
4200-0702-20	OP MANUAL-702 (ALL)		EA	1
6001-0503-00	CORD-POWER 8' MALE/FEMALE PLUGS		EA	1
9000-0702-20	FNL ASSY-702 XMSN TEST SET, 115V		EA	1

PARENT PART: 7000-7702-01		SOFTWARE DEVICE BOM-702B		
COMP. PART NO.	DESCRIPTION	REMARKS	UM	QTY PER
3132-0104-04	IC-16L8A-4 PAL	U71,72	EA	2
3135-7256-25	IC-27C256 32KX8 UV EPROM 250 NS	U81	EA	1
SWAG-7702-00	SOFTWARE ASSY GUIDE-702B	REF	EA	0


SHIPPING ASSY 702 XMSN TEST SET 115V 9500-0702-20
FINAL ASSY 702 XMSN TEST SET 115V 9000-0702-20 J-0702-20 PT-0702-20 PFC-0702-20 AT-0702-20
SHIPPING ASSY 702 XMSN TEST SET 230V 9500-0702-24
FINAL ASSY 702 XMSN TEST SET 230V 9000-0702-24 J-0702-20 PT-0702-20 PFC-0702-20 AT-0702-20
SHIPPING ASSY 702 XMSN TEST SET 48 VDC 9500-0702-23
FINAL ASSY 702 XMSN TEST SET 48 VDC 9000-0702-23 J-0702-23 PT-0702-20 PFC-0702-20 AT-0702-20
CABLE ASSY AC POWER, 702B 6010-1702-16 ED-1702-16
CABLE ASSY DC POWER, 702B 6010-1702-17 ED-1702-17
TESTED PCB ASSY MAIN BD, 702, 115V 8001-1702-11 TP-1702-11
TESTED PCB ASSY MAIN BD, 702, 230V 8001-0702-24 ED-0702-24 TP-1702-11
TESTED PCB ASSY MAIN BD, 702, 48 VDC 8001-1702-12 TP-1702-11
PCB ASSY MAIN BD, 702 8000-1702-11 ED-1702-11 SD-1702-11
PCB ASSY MAIN BD, 702, 48VDC 8000-1702-12 ED-1702-11 SD-1702-11
PROCESS ASSY 702 (ALL) 8850-0702-20
CABLE ASSY-SPEAKER 702B(ALL) 6010-1702-27 ED-1702-27
CABLE ASSY RECEIVE/HOLD 702B 6010-1702-15 ED 1702-15
CABLE ASSY TRANSMIT 702B 6010-1702-14 ED-1702-14
FRONT PANEL ASSY 702 8210-0702-20 ED-0702-20
CABLE ASSY FRONT PANEL I/F 702B 6010-1702-18 ED-1702-18
SOFTWARE DEVICE BOM 702B 7000-1702-01 SWAG-7702-00
CABLE ASSY CHASSIS GND 702B 6010-1702-20 ED-1702-20
CABLE ASSY HOLD SWITCH 702B 6010-1702-21 ED-1702-21
TESTED PCB ASSY FRONT PANEL BD 702B 8001-1702-13 TP-1702-13
CABLE ASSY VOLUME CONTROL 702B 6010-1702-19 ED-1702-19
CABLE ASSY CHASSIS GND, 702B 6010-1702-20 ED-1702-20
PCB ASSY FRONT PANEL BD 702B 8000-1702-13 ED-1702-13 SD-1702-13

Ref. 9000-0702-23
Page B-24

Ref. 9000-0702-24
Page B-25

Ref. 9000-0702-20
Page B-23

DWG NO	PT-0702-20	NT	1	REV	D

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	PRE-PRODUCTION REL. PER ECO # 2675	6-10-87	Jim Hong
—	B	REVISED PER ECO # 2826	03DEC87	Jim Hong
—	C	REVISED PER ECO # 2852	26FEB88	Jim Hong
—	D	REVISED PER ECO # 2906	16MAR89	Jim Hong

PARTS LIST

ITEM NO	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE
FRACTIONS ± — DECIMALS .XX ± — .XXX ± — ANGLES ± —
MATERIAL —
FINISH —
NEXT ASSY 702 | USED ON
QTY. PER | APPLICATION
DO NOT SCALE DRAWING

CONTRACT NO —

APPROVALS	DATE
DRAWN D ECHIVARRE	4-1-87
CHECKED Jim Hong	6 10 87
QA	
PROJECT ENG	7/9/87
ENG MGR/SUPV John Sether	7/9/87

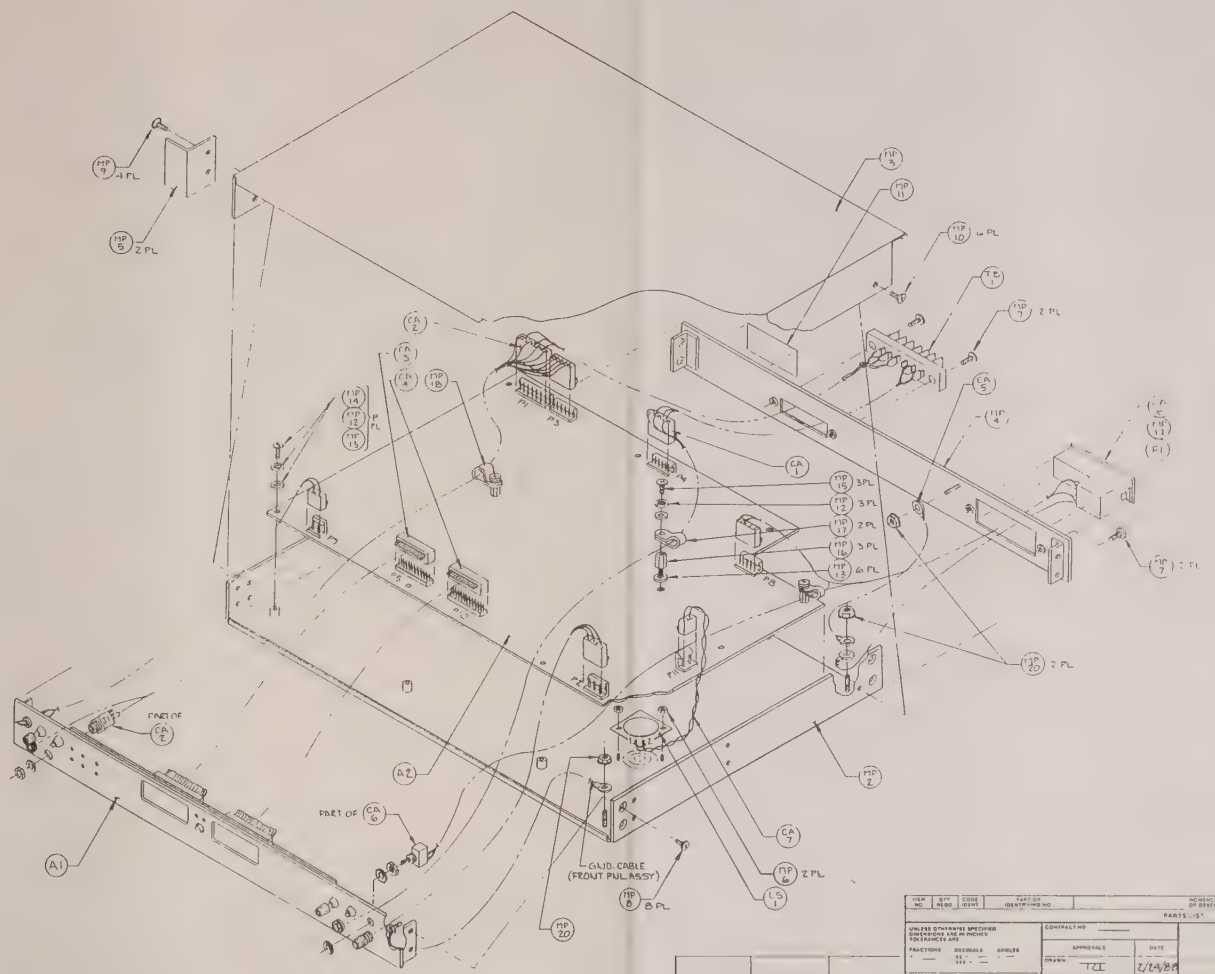
QUANTUM
736 RIVENDALE DRIVE
MOUNTAIN VIEW CALIFORNIA 94043

PRODUCT TREE
702

SIZE D | FSCM NO — | DWG NO PT-0702-20 | REV D
SCALE — | SHEET 1 OF 1

NOTES — UNLESS OTHERWISE SPECIFIED:

CABLE INSTALL. CHART	
REF. DES	TO
CA1-J1	A1-XMT
CA1-J2	A2-P4
CA1-BLK (TERM)	TB1-T
CA1-RED (TERM)	TB1-R
CA1-RED WIRE	XMT-RED
CA1-BLK WIRE	XMT-GRN
CA2-J1	A1-RCV
CA2-J2	A1-DIAL
CA2-J3	A2-P3
CA2-J4	A2-P1
CA2-BLK (TERM)	TB1-T1
CA2-RED (TERM)	TB1-R1
CA2-WHT (TERM)	TB1-S1
CA2-RED WIRE	RCV-RED
CA2-BLK WIRE	RCV-GRN
CA3-J1	A2-P5
CA3-J2	A2-P1
CA4-J1	A2-P10
CA4-J2	A1-P10
CA5-GND	MP4-GND
CA5-GND	MP2-GND
CA6-J1	A2-P8
CA6-GND	MP2-GND
CA7-J1	A2-P11
A1-GND	MP2 GND
A1-HOOK SWITCH	A2-P7
A1 VOLUME	A2-P2
CA7 RED WIRE	LS1-1
CA7-BLK WIRE	LS1-2



Ref. 9000-0702-23
Page B-24

Ref. 9000-0702-24
Page B-25

Ref. 9000-0702-20
Page B-23

[1] FOR MATL LIST SEE: 9000-0702-20 (115V) AND 8850-0702-20.

NOTES — UNLESS OTHERWISE SPECIFIED: : 9000-0702-24 (230V) AND 8850-0702-20.

DWG NO J-0702-20 REV A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PROD RELEASE ECO # 2906	11/14/88	Jon Hoag

DO NOT SCALE DRAWING

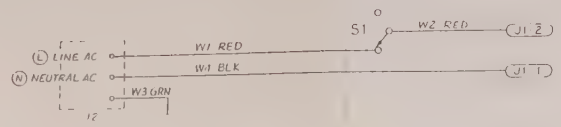
FINAL ASSY - 702 XMSN TEST SET, 115/230V

GR INCOM 735 RAVENDALE DRIVE MOUNTAIN VIEW, CALIFORNIA 94043

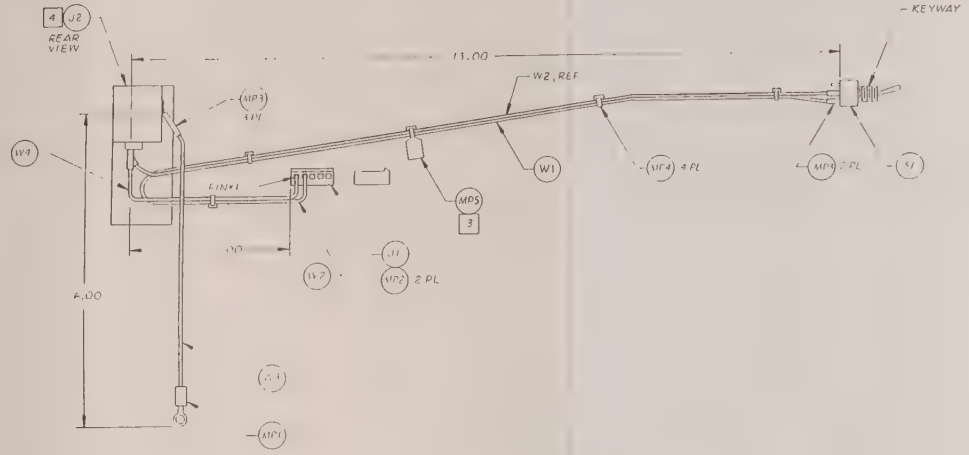
SIZE D | DWG NO J-0702-20 | REV A

SCALE STOCK AS 9000 | SHEET 1 of 1

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PROD. RELEASE PER ECO # 2698	6-24-97	



SCHEMATIC



5. BAG INDIVIDUALLY.
4. REMOVE VOLTAGE SELECTOR CARD FROM J2 AND RETURN TO CXR.
3. STAMP CABLE ID TAG (MP5) WITH 6010-1702-16 AND CURRENT REV LEVEL USING BLACK PERMANENT INK.
2. REFER TO SCHEMATIC FOR ROUTING.
1. FOR LIST OF MAT'L SEE CXR P/N 6010-1702-16.

NOTES — UNLESS OTHERWISE SPECIFIED:

Ref. 6010-1702-16
Page B-3

ITEM NO	QTY PER	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

QTY PER	7028
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± ——— DECIMALS .XX ± .20 .XXX ± ——— ANGLES ± 2°

MATERIAL: 1

FINISH:

DO NOT SCALE DRAWING

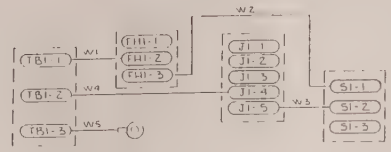
CONTRACTING

APPROVALS	DATE
DESIGN SERGIO R.	5 4 97
CHECKED Tom Hong	6 24 97
QA	
PROJECT ENG	
ENG MANAGER	

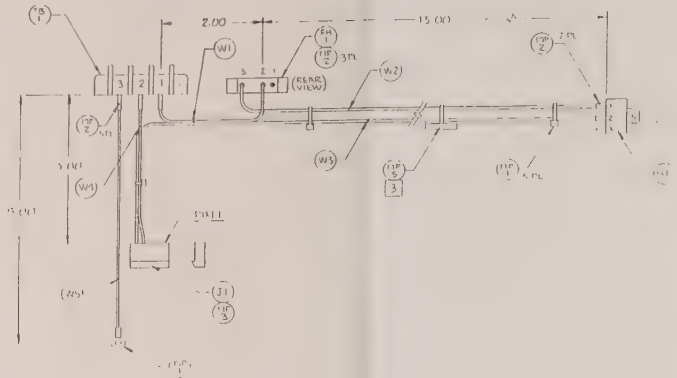
CXR
Larus Corporation
715 RAVENDALE DRIVE
MOUNTAIN VIEW, CALIFORNIA 94043

CABLE ASSY
AC POWER - 7028

SIZE	FSCM NO	DWG NO	REV
D		ED-1702-16	A
SCALE 1:1	STOCK AS 6010	SHEET 1 OF 1	



SCHEMATIC



4. BAG INDIVIDUALLY.

[3] STAMP CABLE I.D. TAG(MP5) WITH 6010-0102-17 AND CURRENT REV. LEVEL USING BLACK PERMANENT INK.

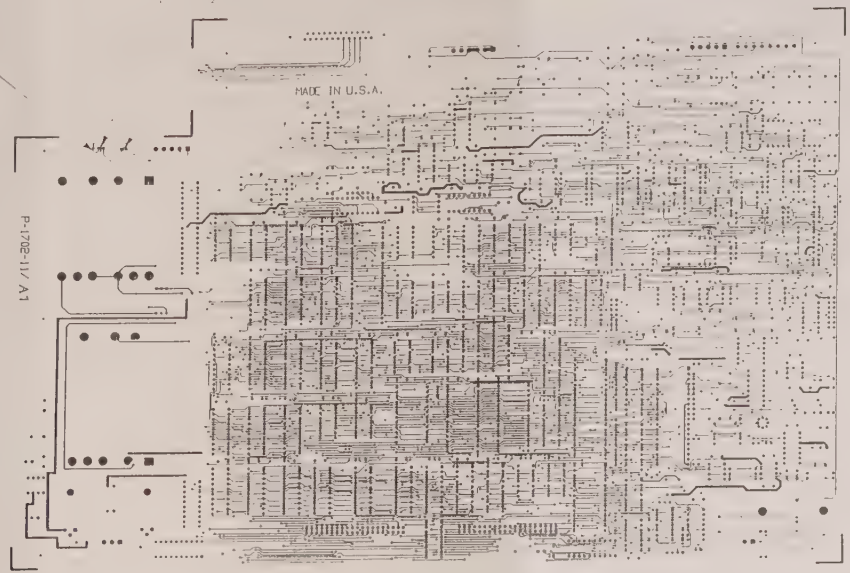
2. REFER TO SCHEMATIC FOR ROUTING.

[1] FOR LIST OF MAT'L SEE 6010-1702-17.

NOTES — UNLESS OTHERWISE SPECIFIED

CABLE ASSY-
DC POWER, 70Z

ED 1702-17 A


CUT TRACE BETWEEN E6-1 & E6-2
CUT TRACE BETWEEN E5-1 & E5-2
JUMP E6-2 TO E6-3 USING 6000-0700-09 WIRE
MADE IN U.S.A.
P-1702-11/A1
SOLDER SIDE

[1] FOR MATERIAL LIST SEE 8001-0702-24

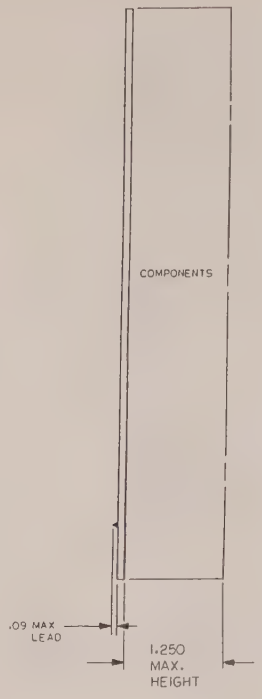
NOTES — UNLESS OTHERWISE SPECIFIED

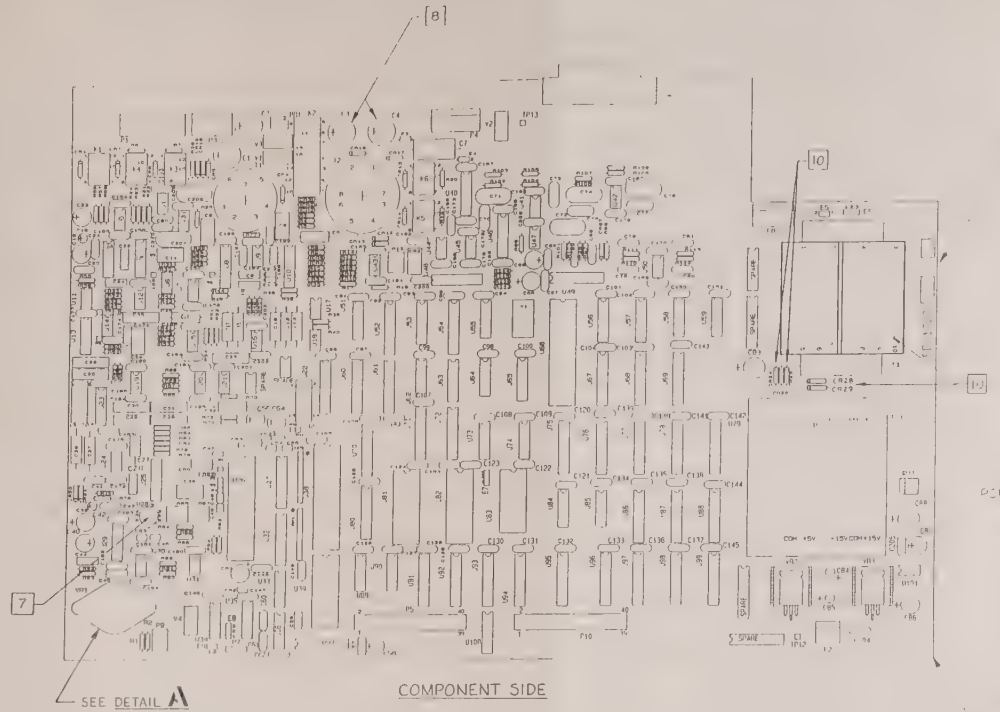
Ref. 8001-0702-24
Page B-18

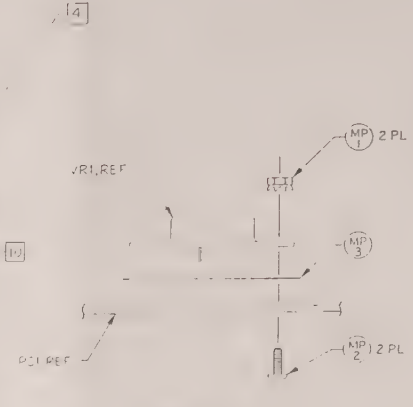
TESTED PCB ASSY - MAIN BD, 702, 230V

ED-0702-24 X

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PRE-PROD. REL. PER ECO # 2626	5-19-87	
	A1	REVISED PER ECO # 2695	6-22-87	
	B	PRODUCTION REL. PER ECO # 2765	9-25-87	
	B1	REVISED PER ECO # 2906	16 MAR 88	







10. DO NOT LOAD T3, CR24,25,28,29, FOR 8000-1702-12 (48 VDC) ONLY.
9. DO NOT LOAD C5,7,74-81; CR1,15; J1,2; K1,6; P6; R3-5,12-18,106-113; U4,22,26,29,38-40,42,43,50,66,71,72,81-83.
8. LOAD C3,4 WITH .30 $^{+.03}_{-.03}$ SPACING FROM BOARD TO BOTTOM OF CAPS.
7. LOAD U28 WITH TAB ON PIN 8.
6. DISREGARD HEATSINK OUTLINES ON SILKSCREEN FOR VR2 & 3.
5. DO NOT SUBJECT T1-3, PS1, K2-5 TO INDUSTRIAL CLEANING SOLUTIONS.
4. STAMP "ED" PART NUMBER AND CURRENT REVISION IN "BOXES" PROVIDED.
3. SQUARE PAD DENOTES CATHODE OF DIODE, POSITIVE END OF CAP, EMITTER OF TRANSISTOR, GATE OF F.E.T.
2. FOR LIST OF MATERIALS SEE 8000-1702-11 (115/230V) OR 8000-1702-12 (48VDC).
1. FOR SCHEMATIC SEE SD-1702-11.

NOTES — UNLESS OTHERWISE SPECIFIED:

Ref. 8000-1702-12
Page B-13 to B-15

Ref. 8000-1702-11
Page B-10 to B-12

QTY PER	APPLICATION
	702

DO NOT SCALE DRAWING

PARTS LIST

ITEM NO	QTY PER	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACT ± DECIMALS ± ANGLES ±

MATERIAL: 2

FINISH

NEXT ASSY | USED ON

	APPROVED	DATE
DRAWN		7-21-87
CHECKED		5-2-88
QA		
PROJECT ENG		
ENG MANAGER	John Sachs	5/11/88

CONTRACT NO

APPROVED

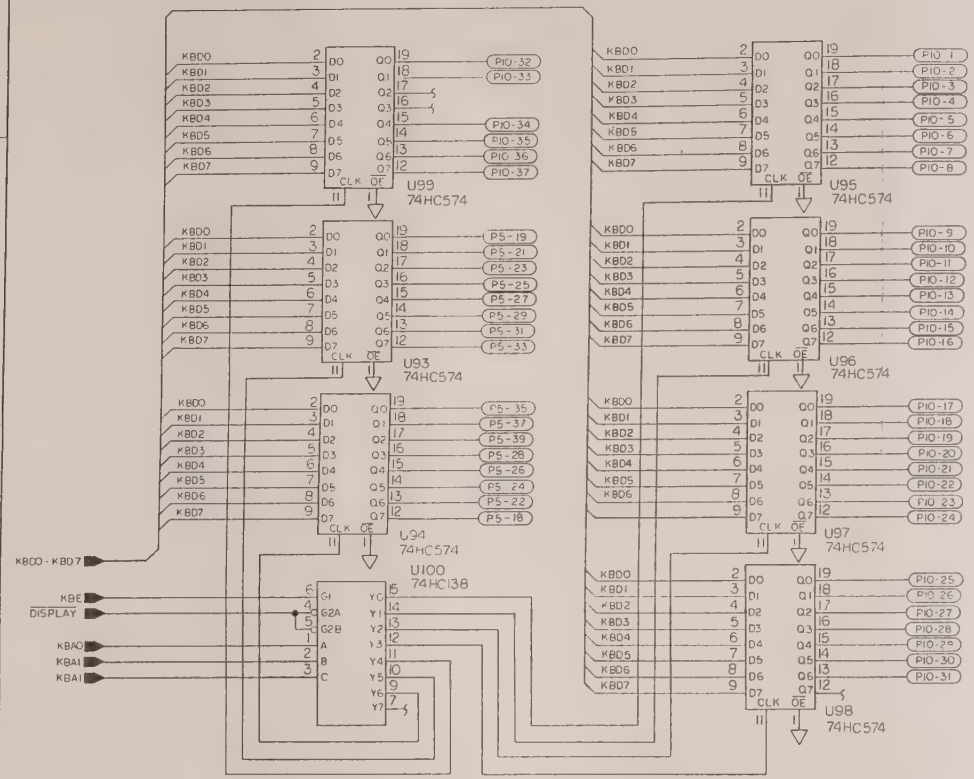
DO NOT SCALE DRAWING

SIZE D | DWG NO ED-1702-11 | REV B1

SCALE 1:1 | STOCK AS 8000 | SHEET 1 OF 1

PCB ASSEMBLY
MAIN BOARD
702

THE RAVENDALE DRIVE
MOUNTAIN VIEW, CALIFORNIA 94043



DWG NO	SD-1702-11	SH	1	REV	B1

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	PRE-PROD. REL. PER ECO # 2626	5-14-87	Jim Hong
—	A1	REVISED PER ECO # 2695	6 23 87	Jim Hong
—	B	PRODUCTION REL. PER ECO # 2765	9-25-87	Jim Hong
—	B1	REVISED PER ECO # 2906	16 MAR 88	Jim Hong

16L8			20		10	U71, 72
8251			26		4	U39
28C16			24		12	U83
320C10			30		10	U66
7552	40	9	39	8	20	U26
2064			28		14	U82
27C256			28		14	U81
63803			21		1	U38
AD536AK	14	3		9,10		U29
AD536AJ	14	3		9,10		U4
7L082	8	4				U3,6,7,9,11,12,14-21,24,30,41-45,47,50
1489			14		7	U36
1488	14	1			7	U33
LM386			6		4	U101
74C923			20		10	U37
LM393	8			4		U1,2,31
AD584	8			4		U28
74HC574			20		10	U22,27,32,52,54,60,61,79,88 93-99
7541	16			2,3		U48
7512	7	1		2		U5,13,23
74HC393			14		7	U35,55
DAC312	20	17		13		U89
74HC294			16		8	U63
74HC245			20		10	U80,86,87
74HC244			20		10	U67,75,76,91,92
74111A			16		8	U53,56,57
74HC139			16		8	U65
74HC138			16		8	U100
74HC74			14		7	U58,59,60
74HC10			14		7	U85
74HC04			14		7	U74,84,89,90
74HC00			14		7	U73,81,93
65681			20		10	U68,69,77,78
2405	11	9		13		U8,25
74HCT573			20		10	U70
7406			14		7	U51
7503	14	15		2	3	U10,40,46
C211	C110-119	IC TYPE	+12V	-12V	-5V	AGND	DGND	REFERENCE DESIGNATORS
LAST USED	NOT USED		PIN NUMBERS					
REFERENCE DESIG		POWER AND GROUND TABLE						

TP13	
R117	
CR29	
E9	
BR1	
T3	
PP2	
V4	
K6	
PS1	
VR3	
Y1	
J2	
P11	
U101	

4. DO NOT USE T3, CR24,25,28,29 ON 8000-1702-12.

3. LOCATIONAL CODING.
EX. XMIT SHT. 2 - B3
ZONE
SHEET
SIGNAL

2. ALL CAPACITORS ARE IN MICROFARADS.
1. ALL RESISTORS ARE IN OHMS, 1%, 1/4W.

NOTES — UNLESS OTHERWISE SPECIFIED:

SPARES

Ref. 8000-1702-12
Page B-13 to B-15
Ref. 8000-1702-11
Page B-10 to B-12

QTY. PER	APPLICATION	DO NOT SCALE DRAWING
	702	

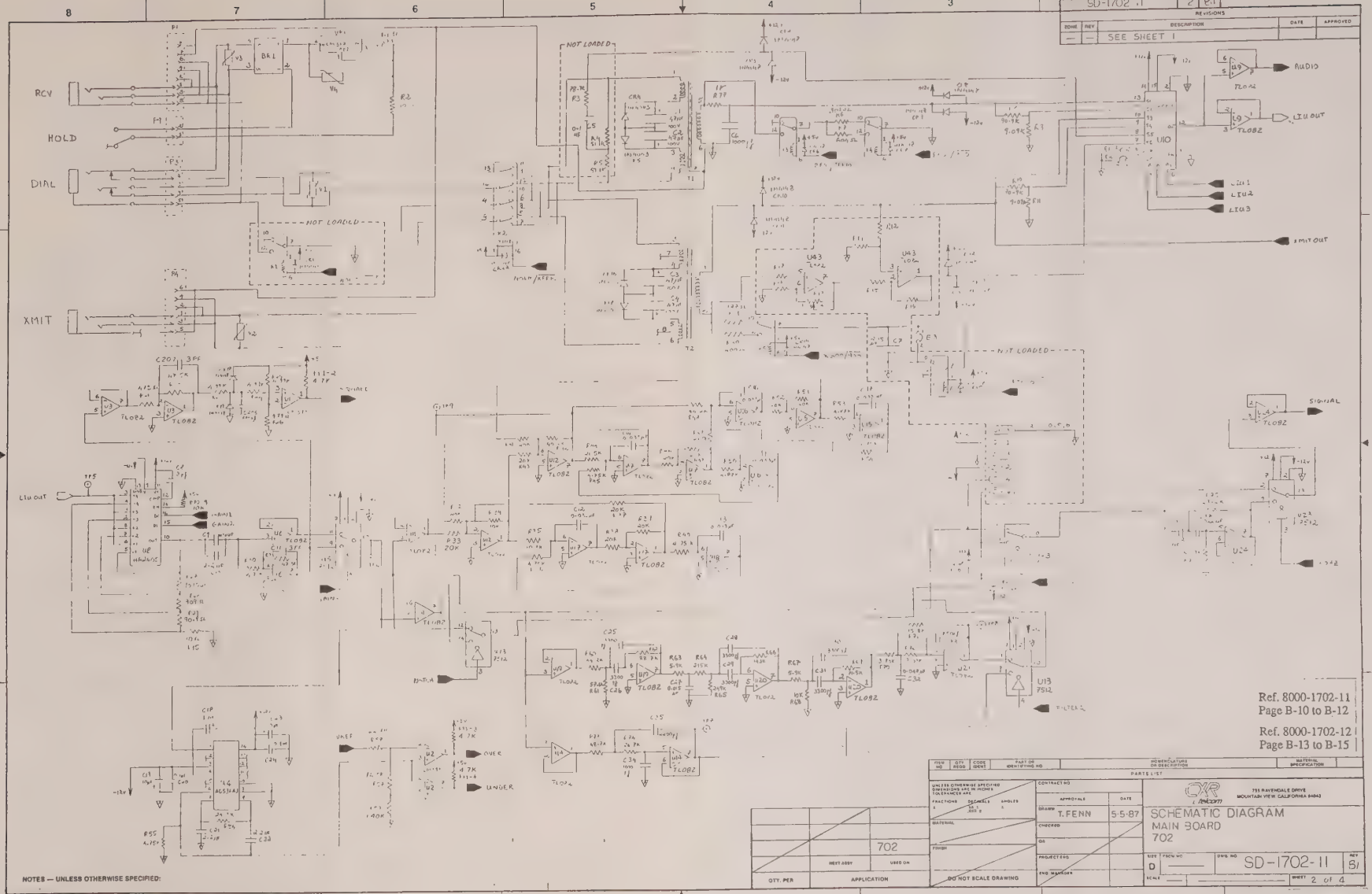
PARTS LIST

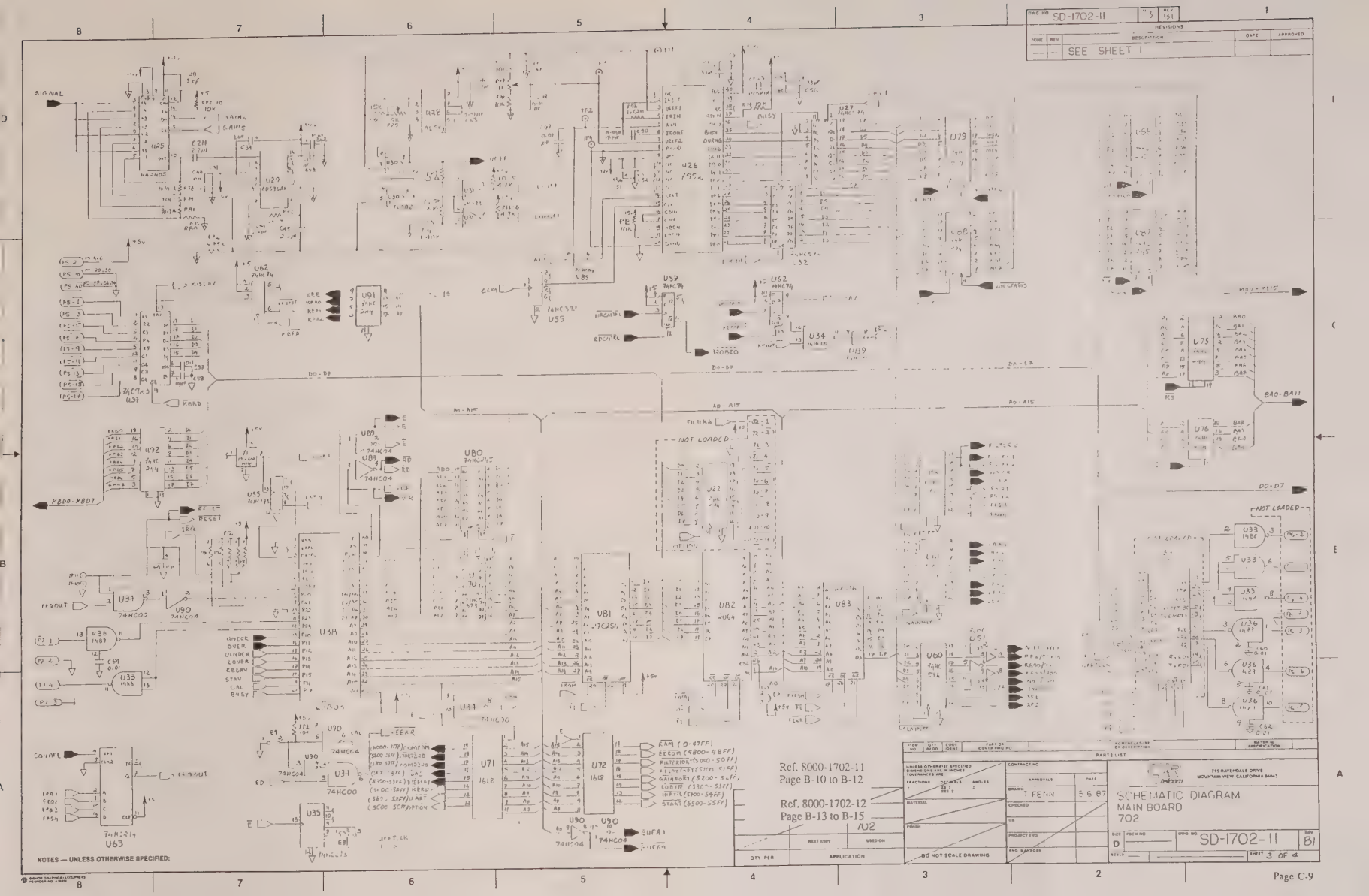
CONTRACT NO
DRAWN
CHECKED
QA
PROJECT ENG
ENG MANAGER
MATERIAL
FINISH
NEXT ASSY
USED ON

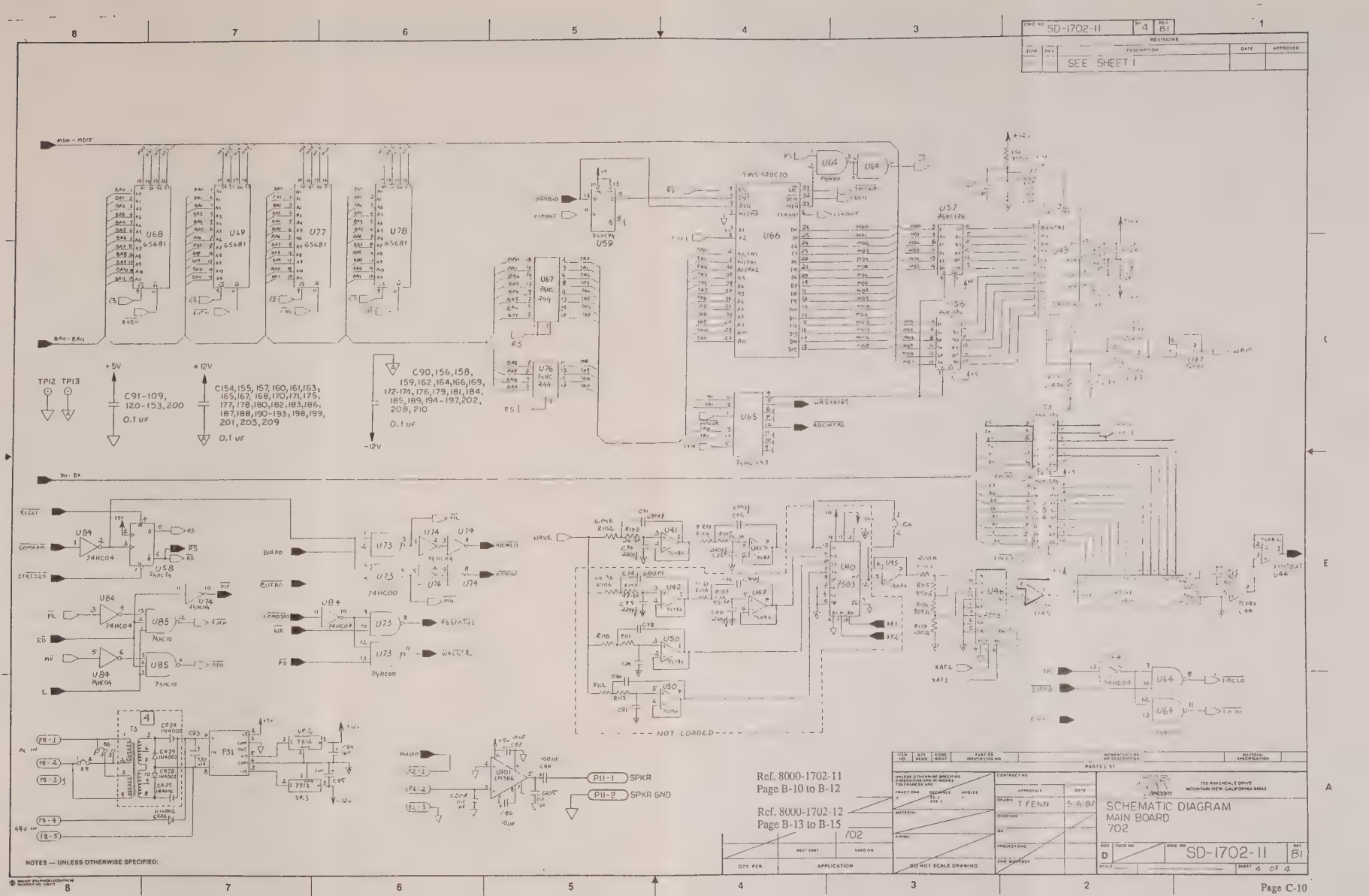
SCHEMATIC DIAGRAM
MAIN BOARD
702

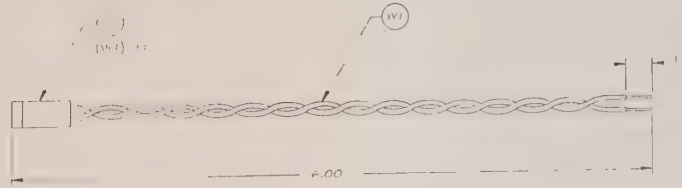
SIZE	TECH NO	DWG NO	REV
D		SD-1702-11	B1

SCALE
SHEET 1 OF 4


DWG NO SD-1702 -1
SHT 2
REV B.1
REVISIONS
ZONE REV DESCRIPTION DATE APPROVED
— — SEE SHEET 1
RCV
HOLD
DIAL
XMIT
NOT LOADED
AUDIO
LIU OUT
LIU1
LIU2
LIU3
XMIT OUT
SIGNAL
FILTER
Ref. 8000-1702-11
Page B-10 to B-12
Ref. 8000-1702-12
Page B-13 to B-15
NOTES — UNLESS OTHERWISE SPECIFIED:
PARTS LIST
CONTRACT NO
APPROVALS DATE
DRAWN T. FENN 5-5-87
CHECKED
QA
PROJECT ENG
ENG MANAGER
SCHEMATIC DIAGRAM
MAIN BOARD
702
SIZE D
DWG NO SD-1702-11
REV B1
SHEET 2 of 4
MATERIAL
FINISH
DO NOT SCALE DRAWING
NEXT ASSY 702
USED ON
QTY. PER
APPLICATION

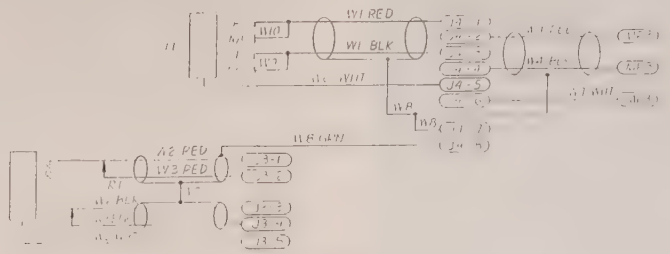

DWG NO SD-1702-11
REVISIONS
SEE SHEET 1
SIGNAL
NOT LOADED
RESET
NOTES — UNLESS OTHERWISE SPECIFIED:
Ref. 8000-1702-11
Page B-10 to B-12
Ref. 8000-1702-12
Page B-13 to B-15
SCHEMATIC DIAGRAM
MAIN BOARD
702
SD-1702-11
SHEET 3 OF 4


SD-1702-11
SEE SHEET 1
MDO - MDI5
BA0 - BA11
DO - D7
+5V
+12V
-12V
TPI2 TPI3
C91-109, 120-153,200 0.1 UF
C154,155,157,160,161,163, 165,167,168,170,171,175, 177,178,180,182,183,186, 187,188,190-193,198,199, 201,203,209 0.1 UF
C90,156,158, 159,162,164,166,169, 172-174,176,179,181,184, 185,189,194-197,202, 208,210 0.1 UF
U68 65681
U69 65681
U77 65681
U78 65681
U59 74HC74
U64 74HC00
TMS 4200C10
U66
U57 74HC174
U67 74HC 244
U76 74HC 244
U65 74HC 157
U58 74HC04
U84 74HC04
U85 74HC10
U73 74HC00
U74 74HC04
U41 TL082
U42 TL082
U40 7503
U45 TL082
U46 TL082
U50 TL082
U101 LM386
P11-1 SPKR
P11-2 SPKR GND
NOT LOADED
Ref. 8000-1702-11 Page B-10 to B-12
Ref. 8000-1702-12 Page B-13 to B-15
SCHEMATIC DIAGRAM
MAIN BOARD
702
SD-1702-11
SHEET 4 OF 4
DO NOT SCALE DRAWING

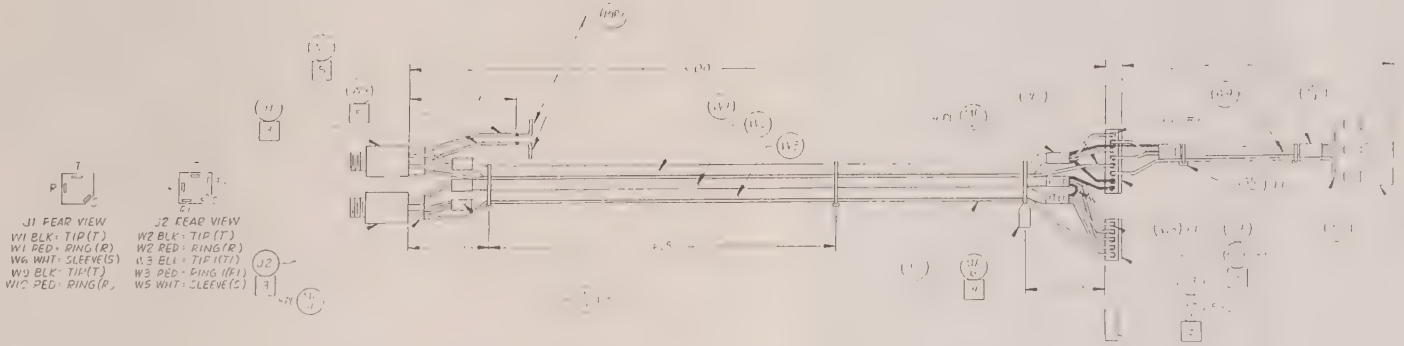


3. EAG INDIVIDUALLY AND MARK WITH P/N 6010-1702-27 AND CURRENT REVISION LEVEL.
2 STRIP WIRES .25 ± .05.
1 FOR MATERIAL LIST SEE 6010-1702-27.

NOTES — UNLESS OTHERWISE SPECIFIED



SCHEMATIC



6. BAG INDIVIDUALLY.
5. STRIP ENDS APPROX. 1/4" (W3,10), THEN SOLDER TERMINALS (P,T) TO WIRES.
4. STAMP CABLE I.D. TAG WITH 6010-1702-15 AND CURRENT REV LEVEL USING BLACK PERMANENT INK.
3. STAMP J1-4 WITH APPROPRIATE REF. DESIGNATOR USING PERMANENT CONTRASTING INK.
2. REFER TO SCHEMATIC FOR ROUTING.
1. FOR LIST OF MAT'L SEE CXP P/N 6010-1702-15

NOTES — UNLESS OTHERWISE SPECIFIED

Ref. 6010-1702-15
Page B-2

REVISIONS			
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	E TEC ECO # 2698		

QTY PER	NEXT ASSY	APPLICATION
	702B	USED ON

DO NOT SCALE DRAWING

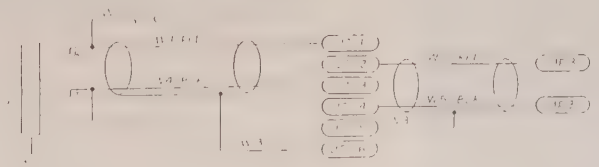
CONTRACT NO	
DRAWN	DESIGN K
CHECKED	
QA	
PROJ ENG	
ENG MANAGER	

355 RAVENDALE DRIVE
MOUNTAIN VIEW, CALIFORNIA 94043

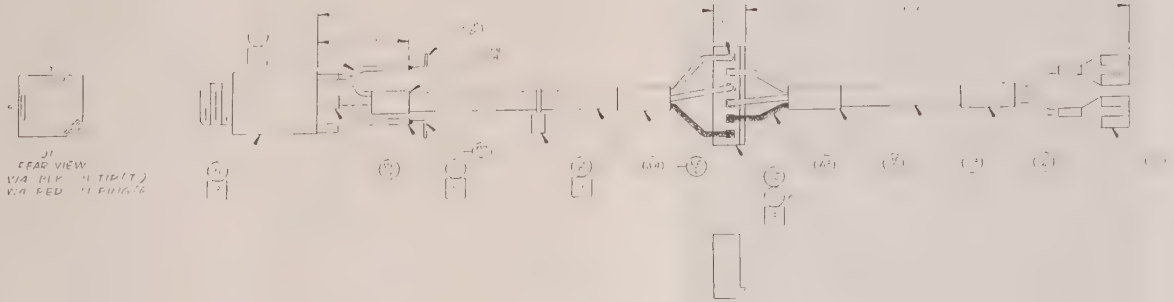
C-ABLE ASSY-
RCV/HOLD 702 B

SIZE	FSCM NO	DWG NO	REV
D		ED-1702-15	C

SCALE 1 : 1 | WEIGHT: AS REQ'D | SHEET 1 OF 1



SCHEMATIC



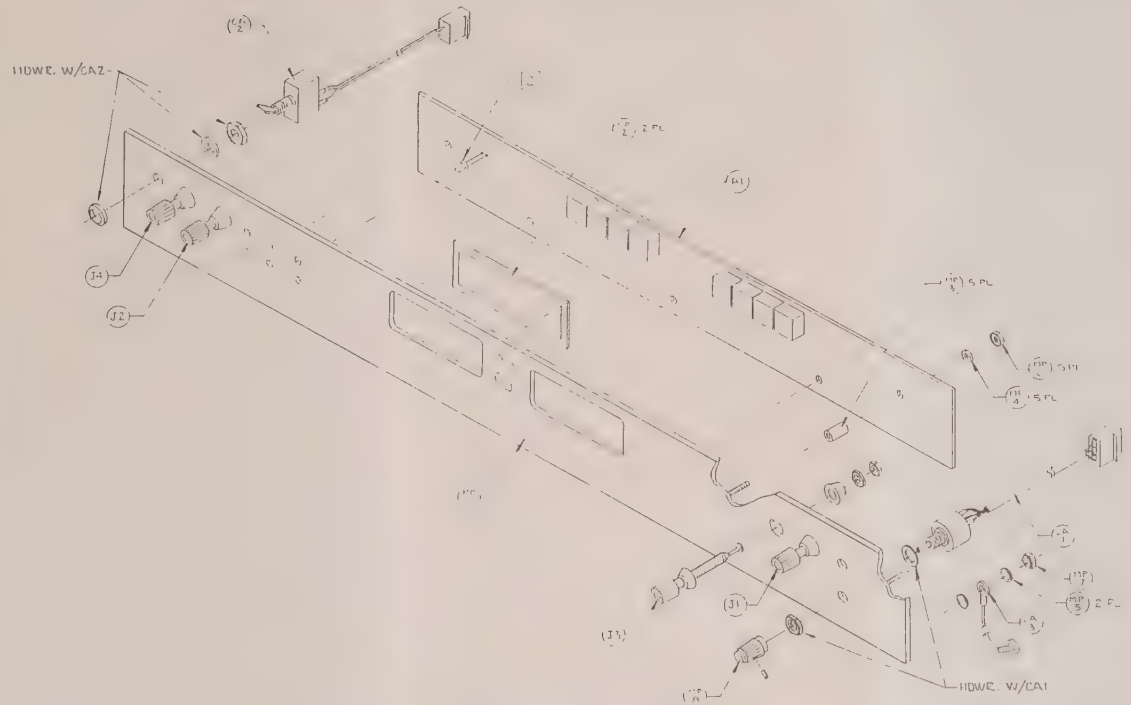
REAR VIEW
W/A PLY "I" TIP(T.)
W/A RED "I" PLUG(S)

NOTES — UNLESS OTHERWISE SPECIFIED

Ref. 6010-1702-14
Page B-1

ABLE ASSY -
MIT. 702B

Page C-13



Ref. 6010-1702-20
Page B-21

[2] BEFORE INSTALLING BD. TO PANEL, CHECK LED ALIGNMENT TO HOLES IN PANEL (71) PL.

[1] FOR MAT'L LIST SEE BZ10-0702-20.

NOTES – UNLESS OTHERWISE SPECIFIED

DWG NO	ED-0702-20	SH 1	REV A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PROD CEL PER ECO # 2906	16 MAR 83	

MATERIAL [1]		
FINISH		
QTY PER	NEXT ASSY	USED ON
	702	
	APPLICATION	DO NOT SCALE DRAWING

PARTS LIST

ITEM NO	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

UNLESS OTHERWISE SPECIFIED DIMENS ONS ARE IN INCHES TOLERANCES ARE

FRACTIONS ± — DECIMALS .X ± — .XXX ± — ANGLES ± —

CONTRACT #

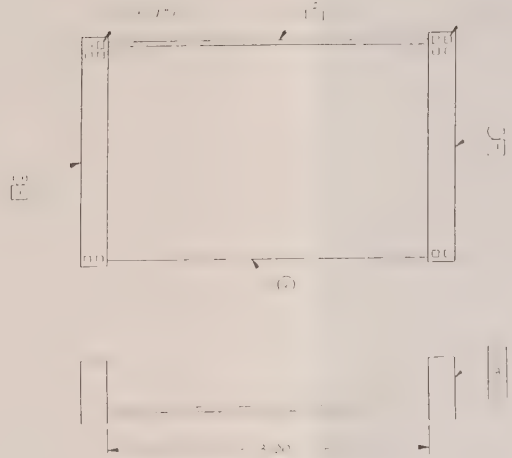
	APPROVALS	DATE
DRAWN	TCI	2/13/84
CHECKED		
QA		
PROJECT ENG		
ENG MANAGER		

TSI RAVENDALE DRIVE
MOUNTAIN VIEW CALIFORNIA 94043

FRONT PANEL ASSY - 702

SIZE	FSCM NO	DWG NO	REV
D	—	ED-0702-20	A

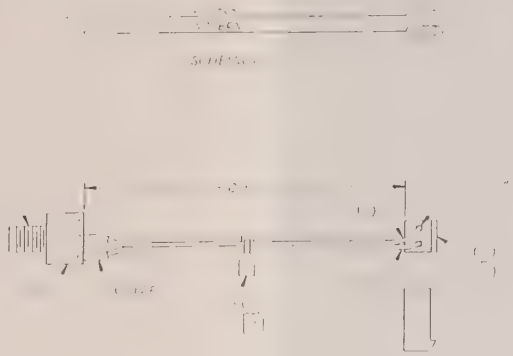
SCALE — STOCK AS BZ10 SHEET 1 OF 1



NOTES — UNLESS OTHERWISE SPECIFIED:

Ref. 6010-1702-18
Page B-5

Page C-15



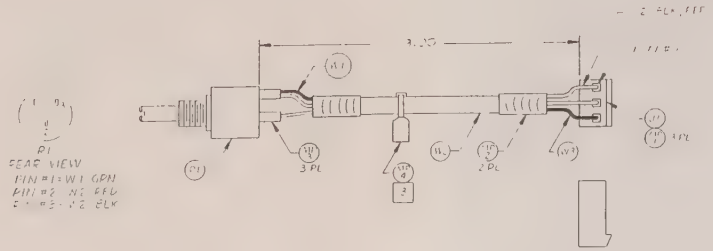
Ref. 6010-1702-21
Page B-8

NOTES — UNLESS OTHERWISE SPECIFIED

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	PER RELEASE LTR ECO # 2648		

SCHEMATIC



Ref. 6010-1702-19
Page B-6

4. BAG INDIVIDUALLY.
3. SLIMP CABLE ID TAG WITH 6010-1702-19 AND CURRENT REV LEVEL USING BLACK PERMANENT INK
2. REFER TO SCHEMATIC FOR WIRE ROUTING.
1. FOR LIST OF MAT'L SEE 6010-1702-19

NOTES — UNLESS OTHERWISE SPECIFIED:

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS DECIMALS ANGLES
.XX ±.010 .XXX ±.005

MATERIAL 1
FINISH
PROJECTION
2ND MARKET

CONTRACT NO
APPROVALS DATE
DRAWN GEORGE R.
CHECKED
QA

DO NOT SCALE DRAWING

QTY PER 1
NEXT ASSY 7028
APPLICATION USED ON

Ltek 755 RAVENDALE DRIVE MOUNTAIN VIEW, CALIFORNIA 94043

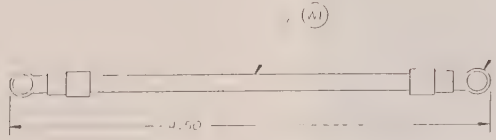
CABLE ASSY-VOLUME CONTROL, 7028

SIZE D
DWG NO 6010-1702-19
REV A
SCALE 1
STOCK AS 6010
SHEET 1 OF 1

DWG NO	REV
ED 1702 20	A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	PROD. RELEASE PER ECO # 2648	4-24-77	



2. BAG & TAG WITH CXR P/N 6010-1702-20 AND CURRENT REV LEVEL.
1. FOR LIST OF MAT'L SEE CXR P/N 6010-1702-20.

NOTES -- UNLESS OTHERWISE SPECIFIED

Ref. 6010-1702-20
Page B-7

ITEM NO	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
				PARTS LIST	

QTY PER	APPLICATION	DO NOT SCALE DRAWING
	NEXT ASSY 702B	USED ON

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX ±.02 .XXX ±.010

MATERIAL 1

FINISH

CONTRACT NO

	APPROVALS	DATE
DRAWN		
CHECKED		
QA		
PROJECT ENG		
ENG MANAGER		

CXR
715 RAVENDALE DRIVE
MOUNTAIN VIEW CALIFORNIA 94043

CABLE ASSY - CHASSIS GND. 702B

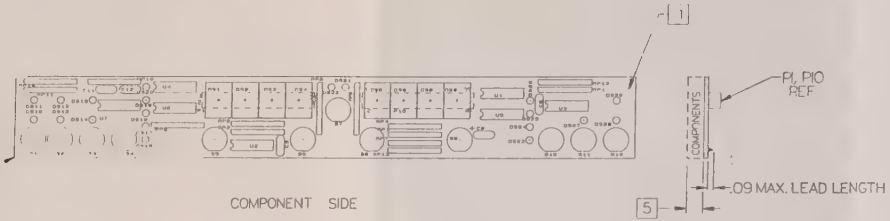
SIZE	FSCM NO	DWG NO	REV
D		ED-1702-20	A

SCALE 2 x 1 STOCK AS 6010 SHEET 1 OF 1

DWG NO	REV
ED-1702 13	A

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
		PER P.E.R. TEP LCO #2657		
	A	PER P.E.R. OWI LCO #2688		



8. LOAD DS1-DS8 FLUSH TO BOARD SURFACE ONLY AFTER P1 AND P10 ARE LOADED.

7. PRIOR TO LOADING DS1-DS8, LOAD P1 AND P10 ON SOLDER SIDE OF BOARD AND TRIM LEADS AS FLUSH AS POSSIBLE

6. DO NOT SUBJECT S1-S12 TO INDUSTRIAL CLEANING SOLUTIONS

[5] LOAD S1-S12 FLUSH TO BOARD SURFACE. MOUNT DS10-DS29 45 HIGH (FROM BOARD SURFACE TO TOP OF LED) . ALL OTHER COMPONENTS NOT TO EXCEED .30 HEIGHT.

[4] STAMP CURRENT "ED" REVISION WHERE SHOWN.

3. SQUARE PAD DENOTES CATHODE OF DIODE, POSITIVE END OF CAP, EMITTER OF TRANSISTOR, OR GATE OF F.E.T

2. FOR SCHEMATIC SEE SD-1702-13.

[1] FOR LIST OF MATERIAL SEE 8000-1702-13.

NOTES — UNLESS OTHERWISE SPECIFIED:

Ref. 8000-1702-13
Page B-17

PARTS LIST

ITEM NO	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

	702	
NEXT ASSY		USED ON
QTY PER	APPLICATION	DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
DRAWN PK FISHER	5587
CHECKED	
QA	
PROJECT ENG	
ENG MANAGER	

MATERIAL [1]

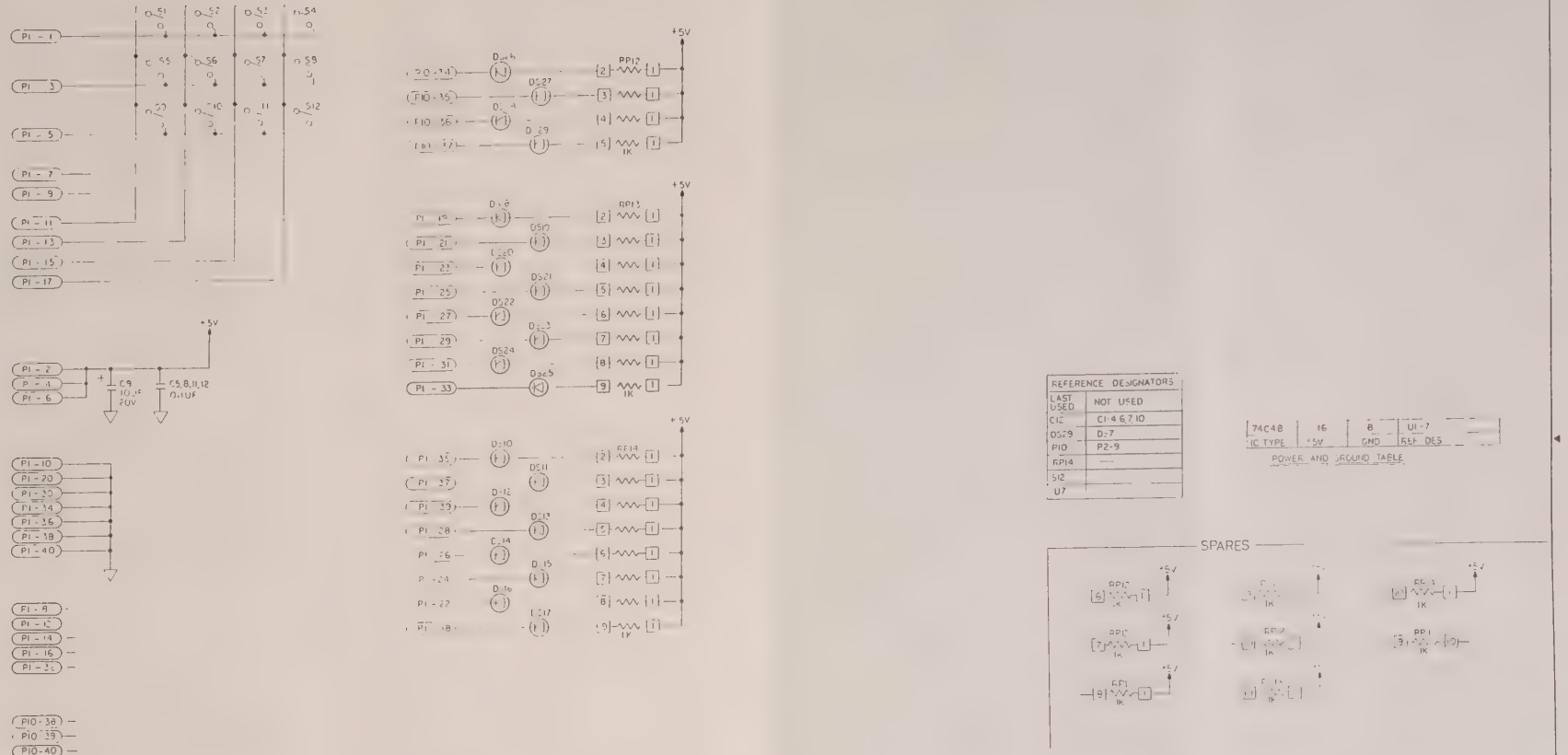
FINISH

CXR Larkspur
720 RAVENDALE DRIVE
MOUNTAIN VIEW, CALIFORNIA 94043

PCB ASSEMBLY
FRONT PANEL BOARD
MODEL 702

SIZE	FSCM NO	DWG NO	REV
D		ED-1702-13	A

SCALE 1:1 STOCK AS 8000 SHEET 1 OF 1



REFERENCE DESIGNATORS	
LAST USED	NOT USED
C12	C1-4,6,7,10
DS29	D-7
P10	P2-9
RP14	—
S12	
U7	

74C48	16	8	U1-7
IC TYPE	+5V	GND	REF DES

POWER AND GROUND TABLE

SPARES

2. ALL CAPACITORS ARE IN MICROFARADS.
1. ALL RESISTORS ARE IN OHMS.

NOTES — UNLESS OTHERWISE SPECIFIED:

QTY PER	APPLICATION	NEXT ASSY	USED ON
			702E

DO NOT SCALE DRAWING

DRAWN	PK FISHER	5 20 81
CHECKED		6 11 81
QA		6/15/81
PROJ ENG		
ENG MANAGER		

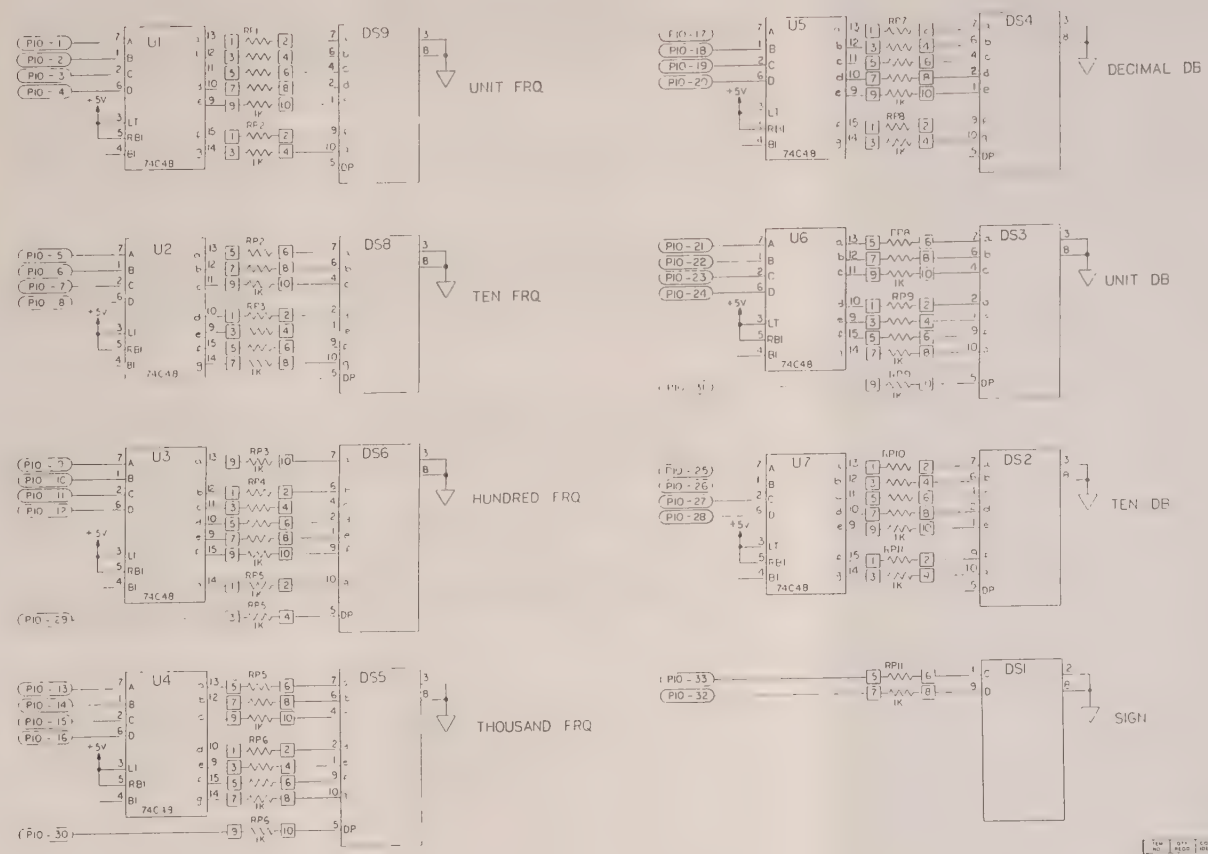
CAR Datacom
735 RAVENDALE DRIVE
MOUNTAIN VIEW CALIFORNIA 94043

SCHEMATIC DIAGRAM
FRONT PANEL BOARD
702B

SIZE D | FSCM NO — | DWG NO SD-1702-13 | REV A
SCALE — | SHEET 1 OF 2

REV	DESCRIPTION	DATE	APPROVED
A	PRE-PROD. REL. PER ECO #2688	6-11-81	

SD-1702-13 | 1 | REV A



Ref. 8000-1702-13
Page B-17

NOTES -- UNLESS OTHERWISE SPECIFIED:

SCHEMATIC DIAGRAM
FRONT PANEL BOARD
MODEL 702

SD-1702-13

Page C-21

WARRANTY

Products manufactured by CXR Telcom Corporation are guaranteed to be free of defects in materials and workmanship for a period of two years from the date of shipment. CXR Telcom will accept returned items, transportation prepaid to the service center, for repair during the warranty period at no cost to the customer, provided that the products have not been subjected to improper installation, accident, misuse, neglect, or unauthorized alterations.

Certification

CXR Telcom Corporation certifies that all instruments are thoroughly tested and inspected and found to meet published specifications when shipped from the factory.

Inspection

All products manufactured by CXR Telcom are carefully inspected and thoroughly tested prior to shipment. Modern packaging techniques are used to prevent damage during shipment. If goods are received in a damaged condition, A CLAIM SHOULD BE FILED WITH THE TERMINATING CARRIER IMMEDIATELY. Normally, the carrier will want to inspect the shipping carton and packing materials.

Repair Service

If equipment does not operate properly when tested in accordance with the instructions, it should be returned to an authorized service center for repair. **Call or write Customer Service for a Return Material Authorization prior to shipping any equipment to the factory.** When returning equipment for repair, utmost care should be taken to avoid shipping damage. If available, use the original cartons and packing material. Shipping charges should be prepaid.

If the equipment is covered by warranty, it will be repaired free of charge or replaced, at the Company's option, and returned prepaid. Unauthorized field repairs or modifications will invalidate the warranty.

For out-of-warranty repair work, Customer Service will provide a quotation for repair charges first, unless the shipment is accompanied by a purchase order. Repair work will be performed after authorization to proceed (in the form of a purchase order) is received.

Service Centers

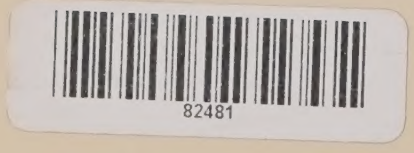
CXR Telcom Corporation
Attn: Customer Service
521 Charcot Avenue
San Jose, CA 95131
(408) 435-8520

CXR Telcom Corporation
Attn: Customer Service
2960 Woodbridge Avenue
Edison, NJ 08837
(201) 494-8822

Document Title: Product Manuals	Document Number: ESC-0377-92-01
Revision Number: A X B_ C_ D_ E_	Page: N/A
Prepared By: Rick Schultz	Approved By: Gary F Wiatt RD
Issued By: Jim Steinau	Issue Date: 10/19/93

CHANGE NOTICE SUMMARY

Revision	Reason for Change	Date of Change



521 Charcot Avenue, San Jose, CA 95131

(408) 435-8520 FAX (408) 435-1276